SEPTEMBER 2, 1996 VOLUME 13, NUMBER 36

Network World

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Going to Interop?

Check out our planning guide to get the most for your money. Page 38.

Standards scrap could throttle Gigabit Ethernet

By Jodi Cohen
Coeur d'Alene, Idaho

While Dole and Clinton duke it out for the White House, another big political battle is brewing in the Gigabit Ethernet standards committee — and the outcome could cost customers a bundle in lost performance.

At next week's three-day meeting of the IEEE 802.3z task force here, debate will center on how to handle carrier-sense multiple access with collision detection in Gigabit Ethernet devices. Most vendors want to fully support Ethernet's "listen then send" access method for fear that without CSMA/CD, customers will not embrace Gigabit Ethernet.

CSMA/CD is a network con-

See **Gigabit,** *page 14*

Find more info on Network World Fusion, including:
- **An Ethernet tutorial**
- **Presentations from the IEEE committee that is drawing up Gigabit Ethernet standards**
- **Gigabit Ethernet overviews and articles**

Select News+. Network World Fusion http://www.nwfusion.com

WorldCom has it all

Company pays $14 billion for MFS, looks to beat rivals to end-to-end punch.

By David Rohde and Joanie Wexler
New York

WorldCom, Inc. last week delivered a message to business users: Dump the Big Three carriers and give us everything.

By purchasing local access powerhouse MFS Communications Company, Inc. — which just finished its own buyout of Internet provider UUNET Technologies, Inc. — WorldCom is building a strong case for displacing rivals by beating them to market with an end-to-end package of local, long-haul and Internet access services.

MFS WorldCom is going to have to win a lot of new business to justify the $14 billion purchase price WorldCom is paying MFS shareholders. But analysts said the company may just be able to pull it off.

Why? Using MFS' local fiber networks, WorldCom could give users a big break on accessing its private line, frame relay and high-volume switched voice offerings. And with UUNET in tow, users could also get fat, economical pipes to the Internet and their own intranets — all

See **WorldCom,** *page 61*

WorldCom *President Bernard Ebbers (left) will be the merged company's president and CEO, while MFS Chairman James Crowe will be the chairman.*

Suits threaten telco competition

By Tim Greene
Washington, D.C.

As if telecom reform has not been long enough in coming, legal actions against the Federal Communications Commission now threaten to delay competition in the local loop for months more, maybe even longer.

Last week, state regulators asked a federal court to overturn

See **FCC,** *page 61*

Sprint to fill SONET gap

Working with LECs to build end-to-end SONET links.

By David Rohde
Kansas City, Mo.

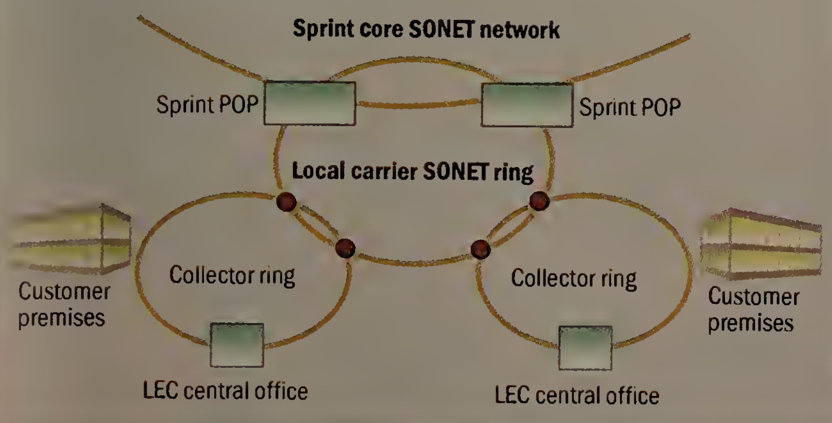
Sprint Corp. is planning to announce this year an end-to-end Synchronous Optical Network (SONET) service that brings millisecond restoral capability to the customer premises.

The service will be based on a program known as Broadband Metropolitan-Area Networks (B-MAN), under which Sprint is quietly working with local car-

See **Sprint,** *page 15*

SONET TO THE PREMISES

How Sprint's B-MAN platform works:



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Access Network World Fusion using the number in yellow. See page 5 for details.

NT Server 4.0 still lacks that enterprise punch

By Christine Burns
San Francisco

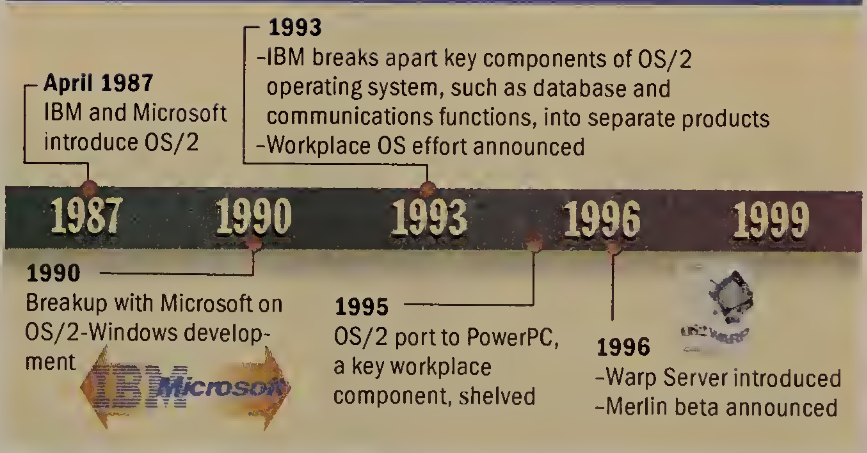
Windows NT Server 4.0 is just about to hit the streets with all the momentum the Microsoft Corp. marketing machine can muscle, but users and analysts say the product simply is not ready for prime time as an enterprise NOS.

The list of reasons why users are hesitant to bet on NT Server 4.0 as an enterprise network operating system is quite short: NT Server lacks a hierarchical directory service, its scalability is questionable and its reliability remains unproven. However, these elements directly affect broader issues such as manageability, security and system availability.

"NT Server 4.0 is greatly improved over previous versions, but it certainly is not the be-all and end-all of network operating systems," said Jason

See **NT Server,** *page 14*

Where does OS/2 go from here?



April 1987
IBM and Microsoft introduce OS/2

1990
Breakup with Microsoft on OS/2-Windows development

1993
-IBM breaks apart key components of OS/2 operating system, such as database and communications functions, into separate products
-Workplace OS effort announced

1995
OS/2 port to PowerPC, a key workplace component, shelved

1996
-Warp Server introduced
-Merlin beta announced

IBM treats 9-year-old OS/2 client like a second-class citizen

By Michael Cooney
Cambridge

Turn out the lights, the party appears to be over.

Two announcements last week demonstrate that IBM just does not take the OS/2 client operating system seriously anymore — an operating system IBM once described as the ultimate network client. IBM, however, will continue to push OS/2 as a server.

Cases in point: IBM subsidiary Lotus Development Corp. last week announced it would "share the development effort" of its OS/2-based SmartSuite line of office connectivity products with Logica, Inc., a $400 million systems integration, consulting and software firm. Logica has been developing OS/2 applications for nearly a decade.

Most experts argue that this is the biggest indication so far that IBM/Lotus has given up on developing OS/2 products.

"It just demonstrates that no

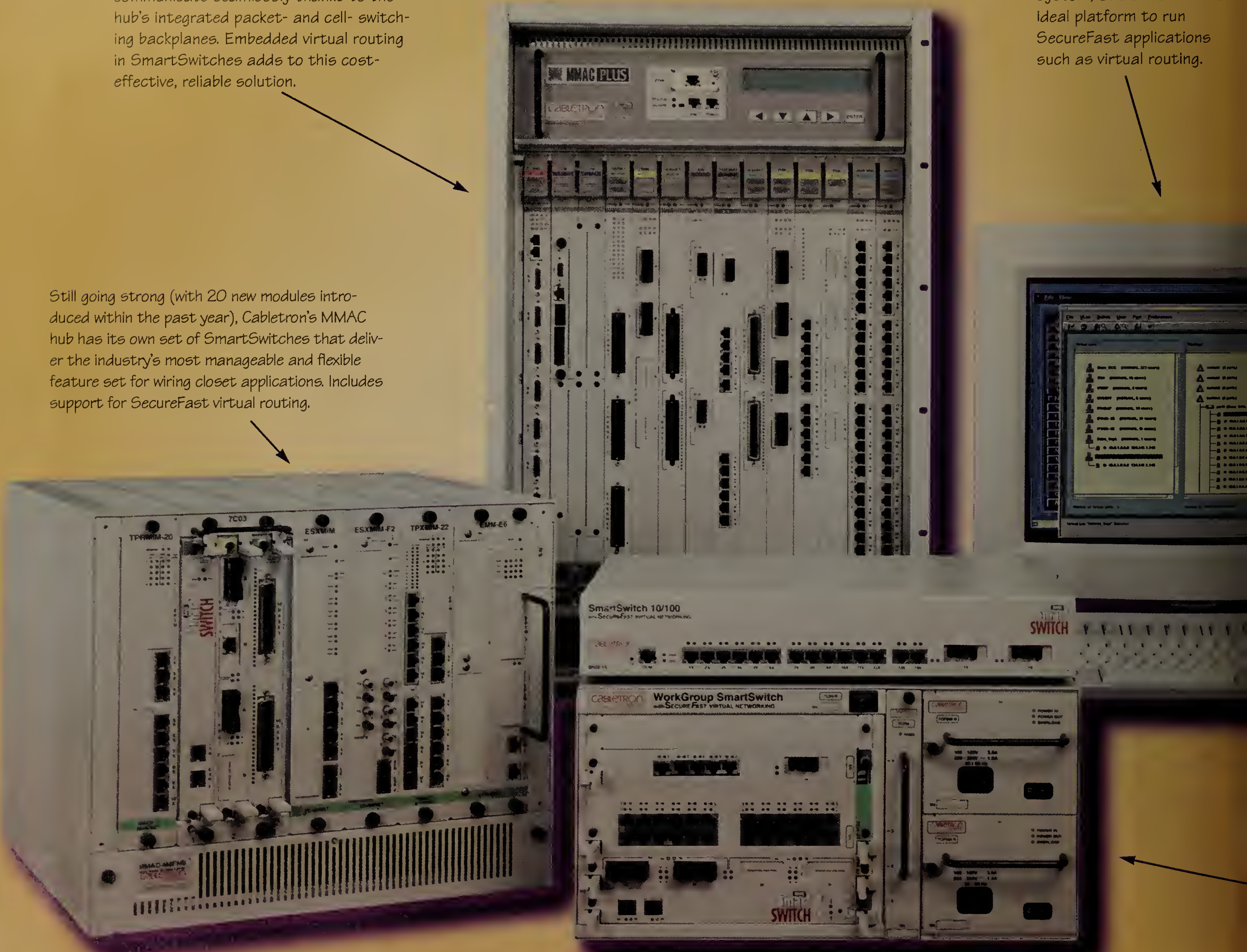
See **IBM,** *page 15*

Why does Cabletron
in their switches than

SmartSwitches can be managed from any SNMP-based platform like Cabletron's SPECTRUM. As the industry's only fully-distributed, multivendor management system, SPECTRUM is the ideal platform to run SecureFast applications such as virtual routing.

The 14-slot MMAC-Plus provides support for Ethernet, Fast Ethernet, Token Ring, FDDI, ATM, WAN and SNA. All technologies communicate seamlessly thanks to the hub's integrated packet- and cell- switching backplanes. Embedded virtual routing in SmartSwitches adds to this cost-effective, reliable solution.

Still going strong (with 20 new modules introduced within the past year), Cabletron's MMAC hub has its own set of SmartSwitches that deliver the industry's most manageable and flexible feature set for wiring closet applications. Includes support for SecureFast virtual routing.



have more routing the routing experts?

It's not a trick question; it's the simple truth. Cabletron's SmartSwitches feature embedded VLAN software that allows for point-and-click adds, moves and changes over multiple protocols–with or without a router. The built-in routing functionality (including support for Cisco's own IOS!) can be controlled through any SNMP-based platform. Not only does this improve manageability and performance of the switches, but it reduces operating costs by eliminating some of the latency and reconfiguration issues associated with the router.

As for the Catalyst 5000 from Cisco, it has no routing support...not even for IOS. This means the switch is still very dependent on the router to perform VLAN-to-VLAN communication over different protocols. And unlike SmartSwitches, the Catalyst 5000 has no broadcast storm protection–again, it must rely on the router to combat the bandwidth and security problems that come with broadcast traffic in a switched environment.

So if it's routing you want, maybe it's time to talk to the switching experts...Cabletron.

Cabletron's Workgroup
SmartSwitches are the first
to feature embedded virtual
routing, per-port RMON and
broadcast storm protection.

The Facts Speak for Themselves

PERFORMANCE	**MMAC-PLUS**	**CATALYST 5000**
Feeder Node Routing	Yes	No
IOS Routing	Yes	No
Virtual Routing	Yes	No
Routed Technologies	Ethernet, Fast Ethernet, Gigabit Ethernet, Token Ring, FDDI, ATM, SNA, WAN	None
Broadcast Control	thresholding, scoping, interception	scoping

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SYNTHESIS

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This Week

News+

- **LDDS Worldcom/MFS acquisition:** Are you ready for changes in local telecom service? This article will help you prepare and provides a hotlink to the latest FCC report on competition in the local loop.
- **Gigabit Ethernet:** Download presentations from the IEEE committee developing Gigabit Ethernet standards, and delve into a collection of *Network World* articles on the new technology.
- **Operating systems:** Does all of IBM support Netscape? See for yourself on the IBM PC homepage
- **TP monitors:** Read articles on Microsoft's TP and middlware plans, BEA's Java application for marrying the Tuxedo TP monitor to the Web and UniKix's CICS-Internet gateway.
- **EDI:** Get background on the subset of EDI transactions being used by the cable and advertising industries to book TV ads over EDI networks.

NetRef

- Read our report on choosing a server clustering system (page 43), then come online for more details about Microsoft's Wolfpack strategy and clustering white papers from the major server vendors. Select Technology Resources, then LANs/NOSes.
- Read our review of Brooktrout's IP/FaxRouter, then jump online for an article on alternative products for faxing over the Internet, as well as reviews of fax servers for NetWare and NT. Select Buyer's Guides and Reviews.

this week's pick

NetWorld+Interop. When the show opens, come to Network World Fusion for exclusive daily coverage. In the meantime, come to the News+ page for our Complete Outsider's Inside Guide to Atlanta — not just another Web city guide.

HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on Registration and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Non-subscribers must fill out an online registration form.

Network World Fusion

PICK OF THE WEEK

Hot Topic

Read Scott Bradner's column on Internet encryption (page 21), then add your opinion online. Select Forum, Columnists, Bradner.

Network World
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NetWorld+Interop 96 Preview

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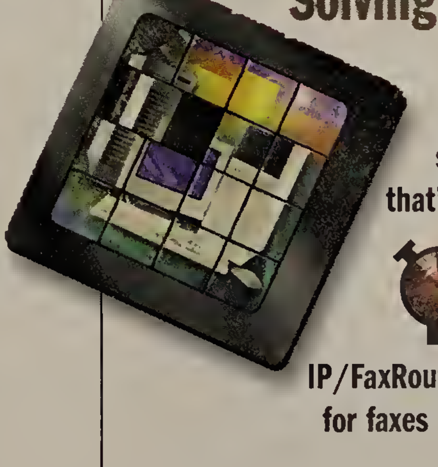

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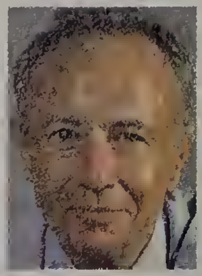
NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

News briefs, September 2, 1996

Microsoft 'explores' forms

With Internet Explorer 3.0 barely out the door, Microsoft Corp. Executive Vice President Steve Ballmer has started talking about what users can expect when Internet Explorer 5.0 ships sometime next year. He said one of the primary goals for this browser release is to create a built-in standard forms-handling environment that simplifies the use of forms within intranet applications. This feature will unify how forms are created by any of Microsoft's visual development tools or within productivity and groupware applications. It will also simplify how they are viewed by end users through the browser, Ballmer said.

Intel backs Microsoft. . .again


Intel's *Grove*

Intel Corp. and Microsoft Corp. seem to agree on just about everything, so it was no real shock that Intel Chief Executive Officer Andy Grove said his company is moving all of its internal desktops to Windows NT. According to Grove, the NT move will reduce the cost of ownership of PC systems. Intel estimates the annual cost of ownership for Windows NT to be $6,300, $8,500 for Windows 95 and $9,200 for Windows 3.1. Hmmm. No mention of OS/2 or Unix?

3Com goes wireless. . .

3Com has developed, but not shipped, its first wireless device. The company has finished a 10M bit/sec wireless Ethernet card. The device will come in two flavors, a PC Card for laptop users and an ISA Card for remote offices. Look for a debut at around $500.

. . .and reorganizes

3Com's *Finocchio*

In a reorganization effort, 3Com Corp. last week announced it has created two new business units to better focus on high- and low-end customers. The 3Com Systems group combines the existing enterprise sales force and customer service groups with the LAN and WAN operations groups. The new unit will be headed by Bob Finocchio and will focus exclusively on high-level enterprise customers. The company also created 3Com Personal Products, which will be run by Doug Spreng, and will concentrate on low-cost networking products for the channel.

Questar's Networking for Dummies

Seattle-based Questar Microsystems has a new package called NetQuest, which the company says is aimed at businesses that lack the know-how to set up their own internetworking infrastructure. We know that loyal *Network World* readers do not fit that description, but the offering could come in handy in remote offices. The system is based on NT Server and can include Sourcecom routers, token-ring cards, ISDN pools, post offices and Web servers.

Bay moves with VLAN tide

Bay Networks, Inc. this week will unveil ATM and virtual LAN upgrades for its Centillion and System 5000 switches. The new products include Layer 3 switching for the Centillion 100 wiring closet switches; the long-awaited "5000BH" Centillion-based ATM backplane for the System 5000; "protocol sensitive" VLAN software that enables Bay gear to selectively switch and route traffic based on network layer protocol; and Integrated Private Network-to-Network Interface software for routing in an ATM environment. The products will be rolled out throughout 1997.

HP accuses former partner of libel

Hewlett-Packard Co. last week said it is moving to dismiss a lawsuit brought against the company by Computer Aid, Inc. in June alleging illegal use of technology developed by New Century Communications, a division of Computer Aid (*NW*, June 10, page 15). At the same time, HP filed a countersuit against Computer Aid seeking libel damages from the company and its attorneys. The suit was file in the U.S. District Court in San Francisco. Computer Aid attorneys characterized HP's countersuit as "posturing," a "smoke screen" and "a desperate tactic."

Wanted: Novell steward with vision of future

By Chris Nerney

Orem, Utah

The person who succeeds Robert Frankenberg as CEO of Novell, Inc. must have a clear vision of the future and the ability to aggressively communicate that vision if the slumping but still well-positioned network giant is to reverse its fortunes.

That is the prescription offered by current and former Novell executives, as well as industry analysts and users, in the wake of Frankenberg's abrupt resignation last week as chairman, president and chief executive officer.

"We have been relatively passive in the past two years," said Joe Marengi, who was named president by the company's board of directors. "That's going to change. No longer will people be asking, 'Where is Novell?'"

The answer to that question, said Steve Markman, executive vice president and general manager of the Novell Products Group, will be "squarely in the intranet marketplace."

Marengi, formerly executive vice president of worldwide sales, joined Markman and Chairman John Young on Thursday to announce Frankenberg's departure. Young said the board "was launching a nationwide search for a new CEO."

Frankenberg has not been available for comment, and a Novell spokeswoman said she did not know his plans.

Frankenberg came to Novell from Hewlett-Packard Co. in April 1994, succeeding Ray Noorda. He immediately began trying to return the company to its networking roots by shedding many of Noorda's acquisitions, including WordPerfect Corp., which Noorda bought in 1994 for $1 billion and Frankenberg sold early this year for $124 million.

Analysts and Novell insiders credit Frankenberg with tackling the job of turning Novell around, but add that he may not have been the right person to compete with Microsoft Corp. and other aggressive rivals.

"It's very clear Frankenberg inherited a nightmare," said analyst Tim Bajarin, president of San Jose, Calif.-based Creative Strategies Research. "He probably spent two of his two-and-a-half years just cleaning up the mess Noorda handed him."

His efforts to stabilize Novell's finances prevented Frankenberg from "assuming a visionary role," Bajarin said. That, along with his less aggressive marketing style, probably sealed his fate with Novell's board, he said.

Sheldon Laube, who worked for only six months as chief technology officer at Novell before leaving in January for start-up USWeb Corp. said "They need to communicate that vision, and they need to make sure their product strategy is consistent with that vision."

Bob Flanagan, director of Internet computing strategies for The Yankee Group in Boston, said even though Novell is still profitable and NetWare has 60% of the NOS market, "the window for turning the company around is rapidly closing."

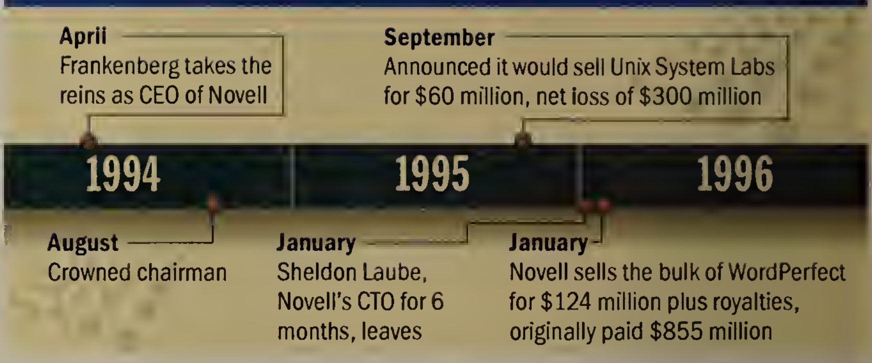
Cindy Borovick, research manager at International Data Corp. in Framingham, Mass., said Novell has been slow to recognize the emerging markets for TCP/IP and the Internet, and also has done a poor job of marketing.

However, she added, recent announcements that Novell will aggressively pursue intranet markets puts the company on the right track.

Tom Kucharvy, president of Summit Strategies, Inc. of Boston, was more skeptical: "Novell is in deep trouble. The company has gone from bad to worse. It's not in a position to get better now."

Kucharvy said he knows what kind of new CEO Novell needs. "They need somebody from Microsoft," he said. "Do you think Bill Gates is available?" ■

Frankenberg had a busy couple of years


April
Frankenberg takes the reins as CEO of Novell
September
Announced it would sell Unix System Labs for $60 million, net loss of $300 million
1994
1995
1996
August
Crowned chairman
January
Sheldon Laube, Novell's CTO for 6 months, leaves
January
Novell sells the bulk of WordPerfect for $124 million plus royalties, originally paid $855 million

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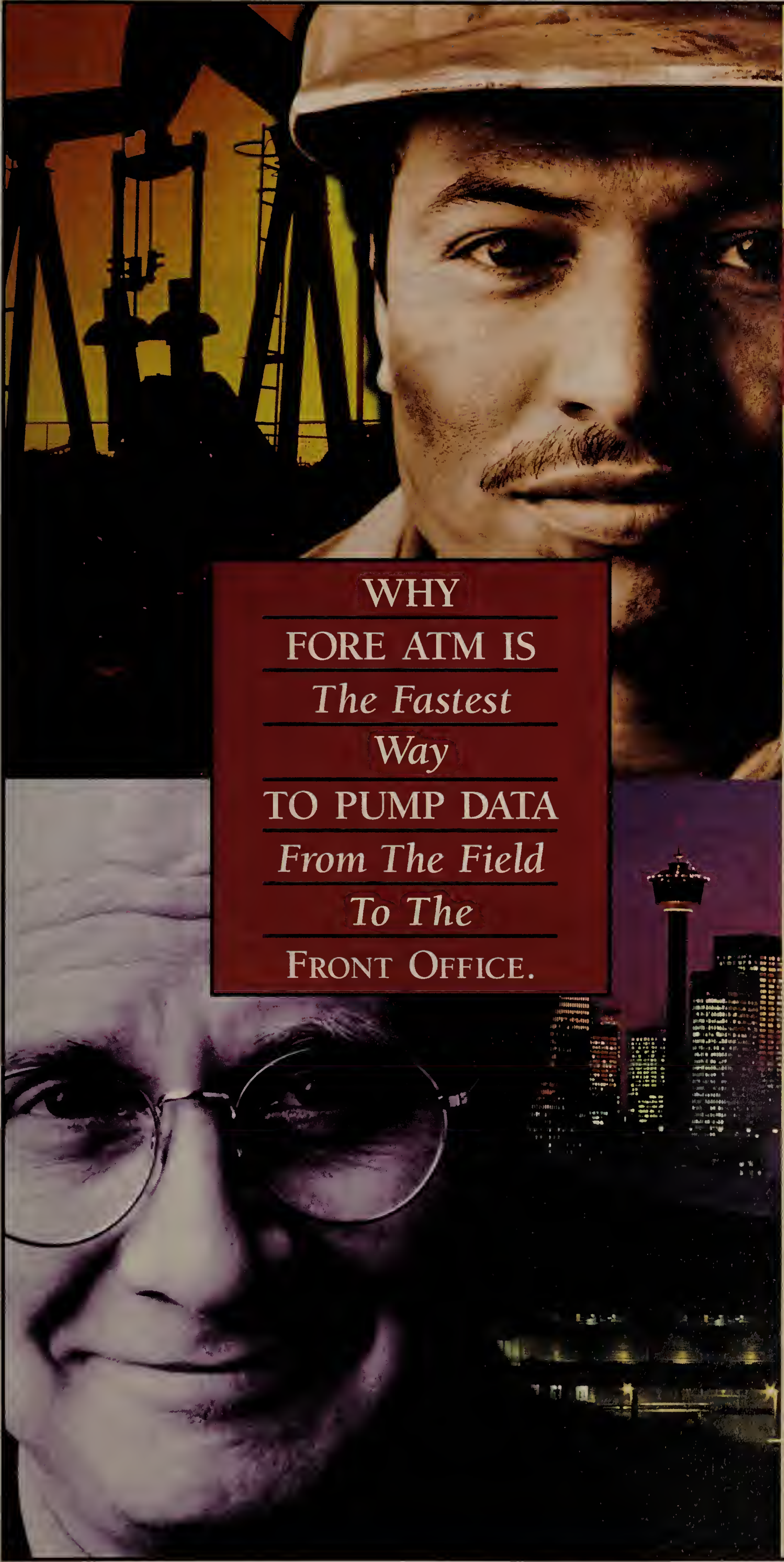

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Andrew Kyle
President
MetroNet

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Clustering

IBM gives big servers more parallel oomph

By Michael Cooney
Boston

IBM later this year will roll out software that will improve the scalability and availability of its large parallel processing servers.

In briefings held this week, IBM executives detailed upcoming features for its RS/6000-based Scalable Power (SP) parallel servers. The new features will let users build larger, more dispersed SP clusters, and improve the availability of those clusters. IBM will also help customers add non-SP products to tightly coupled groups of its parallel processing supercomputers.

IBM hopes the scalability and high-performance features will make the SP more of a fixture in commercial, transaction processing application environments.

"The SP is the shining star of the RS/6000 division, and as IBM pushes these boxes into the commercial server world, scalability and availability will be keys to its success," said Peter Kastner, an analyst with Aberdeen Group, Inc., a consultancy in Boston.

One of the more strategic technologies is Phoenix. The software, which will ship with SP boxes in the fall, will let users manage all aspects of a clustered environment — from middleware and applications to the operating system, said David Turek, director of SP Systems for IBM. "Hardware failures have been the focus of management products in the past, but software availability — applications and the operating system — are the areas Phoenix will focus on," Turek said. "It will be able to monitor and respond to events, track topology of the cluster and define recovery procedures in the event of failures."

Also part of Phoenix will be the ability to link geographically dispersed clusters, so if a node or application fails in one city, another in a remote area or city could automatically take over its work. Late next year the product will become part of IBM's current High Availability Cluster Multiprocessing (HACMP) software, which ensures redundancy among RS/6000-based clusters.

The technology will also be migrated to other IBM cluster packages, such as Application System/400s and PC-based workstations. Phoenix APIs will be published so other vendors can write applications to it, Turek added.

Phoenix will also be crucial to the operation of larger SP clusters, as IBM will be increasing the number of SPs that can be linked together — from eight today to 32 by year-end and 128 in late 1997.

IBM is also planning to open up its SP Switch, the central component in its SP parallel processing environment, so auxiliary devices and applications can have direct access to SP clusters.

The new features will be formally announced in October, when pricing and availability will also be disclosed. ■

Building bigger clusters

IBM's clustering plans:

- Increase the current parallel processing clustering from 8 processors to 128 in the next year
- Improve software, middleware and application availability and redundancy
- Provide improved system management facilities to manage larger clusters
- Open its SP switch to other non-SP devices

Baranof looks to tame Web servers

E-mail management veteran to roll out tool for monitoring IP services.

By Barb Cole
Watertown, Mass.

A leading provider of E-mail management software is about to tackle unruly Web servers.

Baranof Software, Inc. this week will announce IP.Check, software that monitors Internet services and delivers management information to a graphical console. IP.Check can be used to monitor HTTP Web servers, File Transfer Protocol file servers, Simple Mail Transport Protocol mail servers and Net News Transfer Protocol news servers.

The software polls the IP server on a scheduled basis, and either notifies administrators that the server is operational or alerts them of problems. IP.Check uses the same graphical interface as Baranof's MailCheck and ModemCheck offerings. It also has add-ons for sending information to an SNMP-based management system, a Web server or a pager.

IP.Check is also a predictive tool. For example, it can provide throughput reports that would reveal the effect of 70,000 hits per day on the response time of the Web server.

When used in conjunction with the company's MailCheck system, customers can manage proprietary mail systems, standards-based mail and all other IP-based protocol services, according to John Casey, vice president of business development at Baranof. This is key for the growing group of companies that are moving from proprietary mail to hybrid systems that include Internet mail.

The need for products to monitor IP-based services will spike through the next year as more and more companies develop intranets, said Joyce Graff, research director at Gartner Group, Inc., a Stamford, Conn.-based consultancy.

Users applauded the plan.

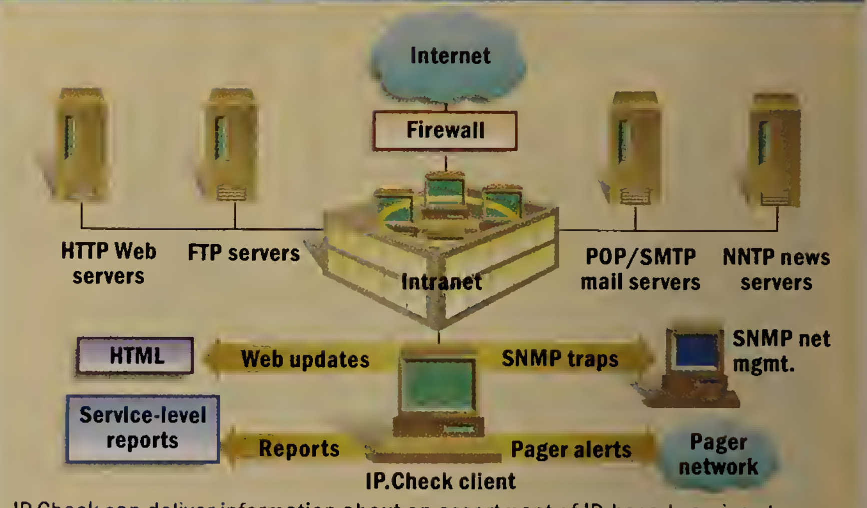
"We're going to have a lot of [intranet] servers out there, and we need to make sure they're OK," said Paul Benfield, senior PC specialist at the Chicago Board of Trade, a current MailCheck and ModemCheck customer that plans to run human resources applications, and directory, budgeting and accounting systems on its intranet.

The client/server software may be run on a single machine, and no software is required on the servers that are monitored. IP.Check runs on Windows NT servers and Windows clients. A Unix version is in the works.

IP.Check will ship in the fourth quarter, and is priced at $495 for a base system to manage one server. Software to manage additional servers is priced at $195 per server.

©Baranof: (800) 462-4565.

Keeping Web servers in Check



IP.Check can deliver information about an assortment of IP-based services to a Windows-based console, SNMP-based management system, Web server, database or pager.

Utilities to plug in to World-Wide Web

Seven electric power companies are creating an OASIS for buyers on the Internet.

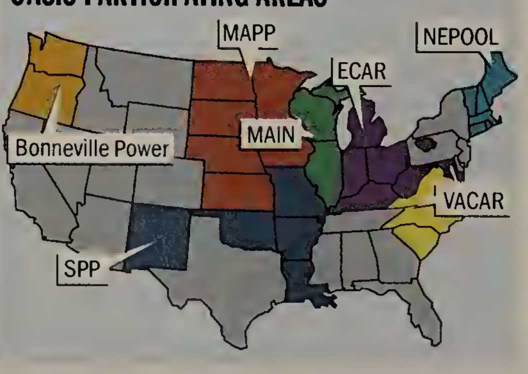
By Ellen Messmer

The World-Wide Web has already revolutionized communications. Now it is going to change the way customers buy electric power.

Utilities across the country this fall will be putting up seven Web sites on the Internet where they can sell transmission capacity directly to customers and power resellers. This move is in response to a government mandate to boost competition.

Dubbed the Joint Transmission Services Information Network (JTSIN), the Web sites are the effort of seven collectives known as power pools, electric power companies sharing a common grid. With each utility's latest rates listed on the seven JTSIN Web servers, buyers can shop for the best deal in electricity. Brokers can also reserve line capacity and have the power shipped across interconnecting grids for use by big power consumers, such as steel mills or auto plants.

OASIS PARTICIPATING AREAS



The utilities are powering up the Web to comply with a new Federal Energy Regulatory Commission (FERC) rule aimed at increasing competition in the industry.

"You have to open the transmission system up to anyone who wants to do business with you," said Frank Royster, director of information technology for Southwest Power Pool, a 16-member utility collective, referring to the FERC rule.

In addition, the FERC rule calls for utilities to establish "Open Access Same-Time Information Systems," dubbed OASIS, to advertise rates and take orders electronically by Nov. 1.

A transmission customer or another utility must have access to an OASIS node that must be made available by the transmission provider, Royster said. Each OASIS will list transmission capability and capacity by hour, week and month, off-peak and on-peak. At present, transmission reservations — a $25 billion business annually — are made via phone or fax.

Not all the nation's power pools have chosen the Web as their OASIS. But six power pools, plus the quasi-governmental energy provider Bonneville Power, will each have a power-pool Web site with T-1 access where power shoppers near and far can use common security procedures to reserve capacity (see graphic). Altogether they represent almost 500 utilities and 80% of the nation's transmission-line capacity.

Although JTSIN promises to open up the closed world of buying megawatts as never before, users should not expect instant competition in power brokering.

Physical power grid limitations and legitimate business reasons, such as the power industry's reciprocity arrangements, mean that JTSIN will not be a free-trading free-for-all at first, Royster said. ■

UB Webifies net mgmt. products

By Jodi Cohen
Santa Clara, Calif.

UB Networks, Inc. last week rolled out a suite of applications designed to make network management as simple as surfing the 'Net. The suite will be shown at NetWorld+Interop 96.

The company's new NetDirector@ Web products allow customers to manage enterprise networks from a Web browser and provide real-time graphical network management, as well as proactive network trend, planning and analysis tools.

UB's *Morita*

The NetDirector@ Web family includes the EMPower Critical Node Monitor application, which runs on top of UB's EMPower net management platform.

The application monitors the reachability of critical nodes, such as routers that are attached to the GeoLAN hubs, according to Ronald Morita, vice president of network applications at UB.

UB also unveiled EMPower Java Applets, which provide graphical real-time management for UB's high-end GeoLAN/500 switching hub. With Java applets embedded in UB hubs, network problems can be detected and corrected without user intervention.

"UB is leveraging EMPower and the Web to have a lot of embedded intelligence and, especially with Java, is making it very easy to manage the network," said John McConnell, president of McConnell Consulting, Inc., a Boulder, Colo., consultancy. "This is a much more dynamic, interactive type of management than we've seen before."

One UB customer said using a Web browser for net management will make his job easier. "With a 24x7 operation, it would be nice for people on-call to be able to use a Web browser from home to dial in to an intranet and troubleshoot problems without having to drive into the office at 3 a.m.," said Ken Hall, associate director for network and communications at the University of Pennsylvania Health Systems in Philadelphia.

The NetDirector@Web product family also includes the Automated Monitoring System, which provides network trend and reporting data based on long-term monitoring of the network.

In addition, UB unveiled NetDirector Homepage, which has policy-based management capabilities. NetDirector Homepage offers a network device directory, hyperlinking all of the EMPower Java applets to simplify network navigation. Homepage also acts as an interface for administrators to create management policies for things such as bandwidth management.

EMPower Java Applets and Critical Node Manager will be bundled together for $7,995 and will ship this month. Pricing for NetDirector Homepage starts at $12,995, and it will be available in November. The network trend and reporting tools are available now for $5,000.

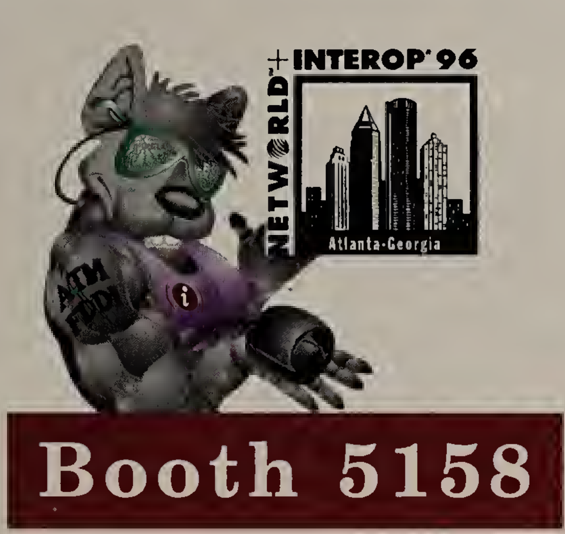
©UB: (408) 496-0111.

CORRECTIONS

The price of the Bay Networks, Inc. Access Stack Node listed in the low-end routers Buyer's Guide (Aug. 26, page 46) should have ranged from $6,000 to $60,000.

In the Aug. 19 issue (page 31), the phone number for BEA Systems, Inc. should have been (408) 743-4000.

The National Science Foundation mistakenly excluded the University of Houston from the list of institutions, printed in the Aug. 19 story "NSF to test 'Net limits" (page 1), that were awarded grants to tap into its new research network. Also, the University of Texas was not among the recipients, as was reported.



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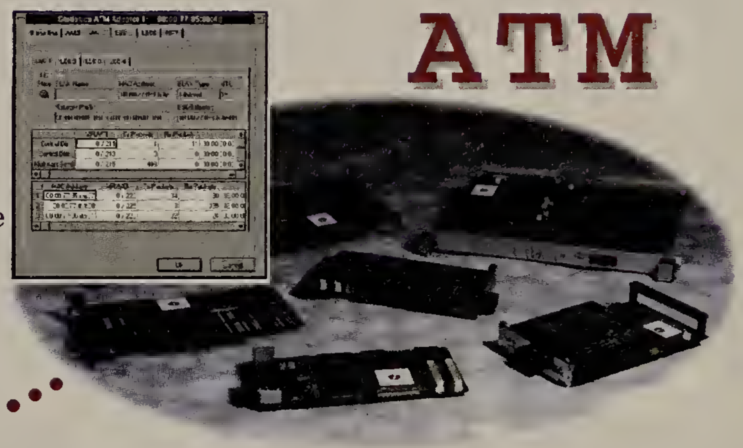

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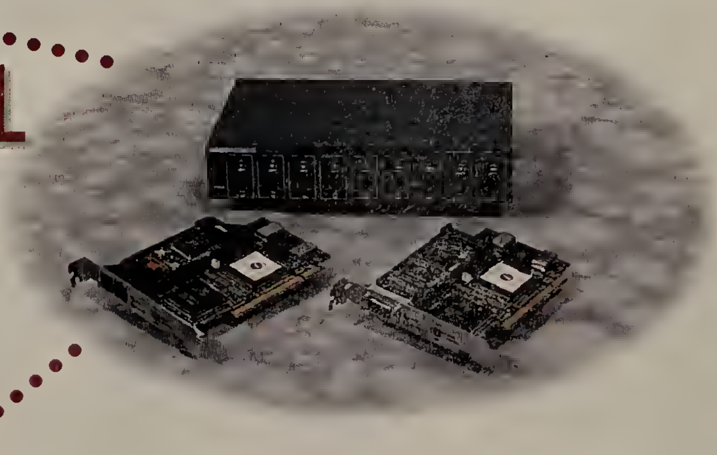

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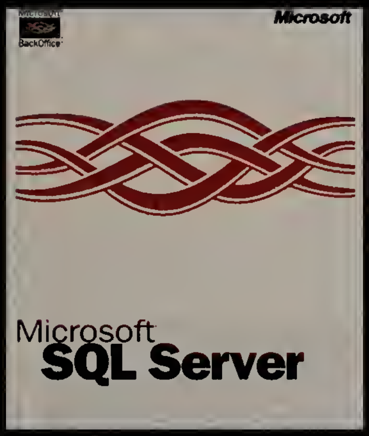

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Cyberdog gets its Navigator

By Sari Kalin
Boston

Building on its OpenDoc commitment, Netscape Communications Corp. will develop with Apple Computer, Inc. a version of its Navigator browser for Apple's Cyberdog Internet suite, company officials announced last week.

Netscape will develop a custom OpenDoc-based component for Cyberdog, which will be available in the middle of next year, officials said. Apple will distribute Netscape Navigator for Cyberdog as the default browser for the Internet suite, which will ultimately be incorporated with the MacOS, officials said.

With the Cyberdog version of Navigator, users will be able to embed browsing capabilities in OpenDoc-compatible applications, officials said.

In May, Netscape announced that it would develop Navigator into a container for OpenDoc parts.

"It shows that they are responding to the Mac market, which demands a lot more personal customization," said Tim Bajarin, an analyst at Creative Strategies, Inc. in San Jose, Calif. "That's very good for Apple customers."

Kalin is a correspondent for the IDG News Service.

CA forges with big wheels

Intel, Microsoft and Tandem to enhance Unicenter TNG.

By Jim Duffy
New Orleans

Computer Associates International, Inc. (CA) last week spiced up its systems management gumbo by cutting deals with three big wheels in the Big Easy.

CA said it will incorporate Microsoft Corp.'s object and Internet technology in CA-Unicenter/The Next Generation (TNG), CA's next-generation systems management framework. Announced a year ago, CA-Unicenter/TNG will ship by December, CA officials said.

CA also allied with Intel Corp. to tightly link Intel's hardware-based agents and LANDesk management software with CA-Unicenter/TNG.

Lastly, CA and Tandem Computers, Inc. disclosed a cross-licensing arrangement that will result in a version of CA-Unicenter/TNG for fault-tolerant computing among Tandem, Win-dows NT and Unix servers.

The partnerships, all announced at CA-World '96 here last week, are indicative of CA's desire to spread CA-Unicenter/TNG wider than the mighty Mississippi during the rainy days before Mardi Gras, analysts said. Of the three, they found the Intel arrangement to be the tip of the delta.

"[Users] will be able to restart servers from CA-Unicenter, [which is] potentially very exciting, especially for multiprocessor platforms," said Paul Mason, research director for systems management at International Data Corp. in Framingham, Mass. "You can execute a hardware reset [or a] remote initial program load, like in mainframes."

CA *chief executive Charles Wang presides at the CA-World '96 conference.*

Nonetheless, CA's challenges will be to get CA-Unicenter/TNG out the door and embraced by customers like a lamppost on Bourbon Street. Though technically elegant, CA-Unicenter/TNG may be too jazzy for users dancing to CA-Unicenter's current tunes, observers noted.

"We've got [CA-Unicenter/TNG] loaded in the lab, but we haven't spent a lot of time with it right now," said Tony Navarro, manager of systems management at Baxter Healthcare Corp. in Deerfield, Ill. Navarro said he did not have a timeframe for implementing CA-Unicenter/TNG.

Under the Intel arrangement, CA-Unicenter/TNG users will be able to collect temperature status, voltage status and cabinet intrusion data from Pentium Pro servers. Servers in non-operational states can be reset, rebooted and powered on from a single CA-Unicenter/TNG interface, CA said.

CA taps Microsoft

The Microsoft deal calls for CA to use Microsoft's ActiveX programming language and Internet Explorer browser as the basis for Internet and intranet access to CA-Unicenter/TNG. CA will also support the HyperMedia Management Schema and HyperMedia Management Protocol as the basis for interoperability with future Microsoft systems management offerings, the companies said. These are components of the Web-based Enterprise Management initiative announced by Microsoft and four other companies last month (*NW*, July 29, page 1).

CA will also add support for Microsoft's Component Object Model and Distributed COM object technologies in CA-Unicenter/TNG.

Lastly, CA will use Microsoft's Wolfpack Windows NT Server clustering technology to provide fault tolerance for NT-based CA-Unicenter/TNG servers. Wolfpack is also a key component of CA's joint development and cross-technology licensing arrangement with Tandem.

CA and Tandem will jointly develop a cluster-aware version of CA-Unicenter/TNG for management of Windows NT, Unix and Tandem Himalaya server clusters. The product, Unicenter-HA, will be released later this year. A subsequent version will be released by the end of 1997.

©CA: (516) 342-5224.

Worldtalk pushes global directory

By Barb Cole
Santa Clara, Calif.

Worldtalk Corp. this week will announce plans to enhance its directory synchronization software to support the creation of meta directories.

The company will revamp its NetJunction product so it can import content from multiple directories and manage that information from a variety of applications, such as mail systems and databases.

"We need [a meta directory] desperately," said Marty Wiegle, manager of messaging at Fannie Mae in Washington, D.C.

"I have end users complaining all the time that [our directories are] out of date," she said.

NetJunction already does directory synchronization, but the enhancements will extend those capabilities. For instance, NetJunction may be used to replicate user information from Microsoft Corp.'s Exchange to Novell Directory Services (NDS). However, if a prior record for an Exchange user exists in NDS, a duplicate record will be created. Down the road, NetJunction will only replicate the information not already stored in NDS, according to Simon Khalas, director of product marketing at Worldtalk.

NetJunction will exploit Lightweight Directory Access Protocol to glean information from operational directories and will be based on an X.500 backbone.

Users still have a bit of a wait for the Worldtalk tool. NetJunction Release 5.0, which will include the meta directory capabilities, is not due until the first half of 1997. It will run on Hewlett-Packard Co. servers, and a version for Windows NT is planned. Pricing was not available.

©Worldtalk: (408) 567-1500.

Call centers test AT&T's low-risk Web option

By David Rohde
Phoenix

AT&T last week announced it is helping call centers test a way to handle live inquiries from the World-Wide Web and complete transactions without installing new hardware or software.

Choose your method

Pros and cons of Web call center integration:

Premises-based

Pros:
- ▲Entire Web site available to caller
- ▲Some products already commercially available

Cons:
- ▼Requires computer-telephony links on premises
- ▼Substantial purchase and installation costs

AT&T network-based

Pros:
- ▲Few or no installation costs
- ▲Works across multiple ACD platforms

Cons:
- ▼Limited number of static pages available to caller
- ▼Not yet commercially available

The carrier is calling it Project Instant Answer (Project IA), a market test that integrates Web electronic commerce with several trial users' telephony call centers on a real-time basis.

Under Project IA, launched at the Incoming Call Center Management show here, the user-company designates selected Web pages — such as product or service descriptions — to be hosted in an AT&T network server.

When a customer browsing the company's Web site inputs a phone number and clicks on a "call me now" button, the AT&T network captures the request and forwards it to a human agent, along with the URL of the Web page the customer is looking at.

A call is then placed from the agent to the customer over regular phone lines.

In a process AT&T officials dub page-push, the agent can then choose any of the AT&T-hosted Web pages to deliver to the customer's screen.

If customers decide to buy something, they can give the purchase information over the phone, alleviating qualms about sending credit card numbers over the Internet.

Project IA resembles products recently introduced by makers of automatic call distributors, such as Aspect Telecommunications, Inc.'s Aspect Interactive Web.

The difference is because both the voice and Internet traffic are handled entirely within the AT&T network, the user-company does not require any new hardware or software.

However, once the phone call is made, Project IA limits the customer to AT&T-hosted Web pages "pushed" by the call center agent. With Aspect Interactive Web, the customer is free to continue browsing the company's Web site while the agent follows along (*NW*, Aug. 12, page 17).

Analysts shrugged off Project IA's limitations. Many companies need a low-cost way to discover how many customers want human assistance during a Web shopping trip, according to Peter Bernstein, president of Infonautics Consulting, Inc. in Ramsey, N.J.

"As we go through these baby steps in cyberspace commerce, the big advantage to doing anything that is [carrier] network-based is that the risks aren't high," Bernstein said. "If the trial works, then you can go to the CPE implementation, if that makes sense."

Project IA users will have to pay a per-transaction fee to AT&T. Exact prices will be determined after the trial ends near the end of year, said Jody Wacker, AT&T's national marketing director for strategic call center solutions. ■

Netscape eyes non-PC hardware

By Elinor Mills
San Francisco

Navio Communications, Inc., a new spin-off of Netscape Communications Corp., will develop software to run on a range of non-PC Internet access devices that will hit the market next year, officials said last week.

The devices include set-top boxes, telephones, personal digital assistants, game players and other networked appliances, said Jim Clark, Netscape chairman as well as Navio chairman.

Netscape's partners in the venture include IBM, Oracle Corp., NEC Corp., Sony Corp., Sega Enterprises, Ltd. and Nintendo Co., Ltd. Clark and other executives refused to disclose which are investors in Navio or to discuss other specifics.

In tailoring Netscape Navigator to run on the devices, Navio will break the browser into components and either develop a separate operating system for specific devices or port the browser technology to other real-time operating systems, such as the Java operating system, that runs on the devices, said Marc Andreessen, senior vice president of technology and cofounder of Netscape.

Initially, Navio will rely on Netscape's server software to work with the client software, he said. The software will primarily be written in C, with some written in assembly to operate efficiently on devices that have 2M to 8M bytes of RAM.

The idea is to provide an operating system that can stream information to users in "channels," Andreessen said.

In contrast to today's model, in which users chase down the information they want from a particular site, the channels model will broadcast information to the user, he said.

Andreessen estimates that by the year 2000, as many as 500 million non-PC-based Internet devices will be in operation. "As developing countries modernize and industrialize, these devices offer a huge opportunity to quickly build an information infrastructure," he said.

"The Internet will be the electricity to the consumer device in the next century," Yen said.

Microsoft Corp. and other companies probably will not be far behind Netscape in aggressively pushing into the Internet device arena, according to Gary Schultz, principal analyst at Multimedia Research Group in Sunnyvale, Calif.

"We think there will be a market for Internet applications, and they won't be PC-based," he said. "[But] how will they attract the developers, and will the developers know that the tools they'll be using will be cross-platform?"

Mills is a correspondent with IDG News Service.

Vendors support NetMeeting

By James Niccolai
Boston

Users of Microsoft Corp.'s NetMeeting software should find it easier to contact each other since several Internet white-page directory vendors last week agreed to support the conferencing and collaboration software.

Users of NetMeeting can access white-page directories using their Web browser. Once they register, other users of NetMeeting can search and connect to them over the Internet for voice or data communication, regardless of which User Location Service they are connected to.

Companies participating in the agreement include InfoSpace, Inc., Bigfoot Partners L.P., Four11 Corp., Coordinate.com and WhoWhere?, Inc.

NetMeeting can be downloaded free of charge from Microsoft's Web site at http://www.microsoft.com/ie/. Versions are available in Brazilian, Portuguese, simplified and traditional Chinese, French, German, Italian, Korean, Japanese and Spanish.

Niccolai is a correspondent with IDG News Service.

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October	1	Philadelphia
October	2	Baltimore
October	3	Charlotte
October	8	New York
October	9	Ottawa
October	10	Calgary
October	15	Iselin/Edison
October	16	Boston
October	17	Washington DC
October	22	Kansas City
October	23	St. Louis
October	24	Chicago
October	29	Salt Lake City
October	30	Denver
October	31	San Antonio
November	5	New Orleans
November	6	Dallas
November	7	Houston
November	12	Atlanta
November	13	Tampa
November	14	Miami
November	19	San Francisco
November	20	Bellevue
November	21	Vancouver
December	3	Scottsdale
December	4	Albuquerque
December	10	San Diego
December	11	Newport Beach

EUROPE

August	22	Helsinki
August	28	Germany
September	10	Germany
September	11	Germany
September	12	Germany
September	16	Germany
September	17	Germany
September	18	Germany
September	23	London
September	24	Amsterdam
September	26	London
October	2	South Africa
October	3	South Africa
October	4	South Africa
October	16	Paris
October	17	Milan
October	22	Stockholm
October	23	Frankfurt
October	24	Munich
October	25	Madrid

ASIA-PACIFIC

September	2	Taiwan
September	4	Singapore
September	6	Indonesia
September	9	Philippines
September	10	Malaysia
September	12	Thailand
September	16	India
September	18	Hong Kong

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Gigabit

Continued from page 1

trol scheme that listens for conflicting traffic to avoid data collisions. But supporting CSMA/CD at gigabit speeds will give customers a minimal performance boost over current Ethernet implementations, according to testing done by the IEEE. In the worst-case scenario, customers might only get 200M bit/sec performance — far below its theoretical limit.

So Bernard Daines, president of Packet Engines, Inc., a Gigabit Ethernet start-up in Spokane, Wash., and founder of Fast Ethernet pioneer Grand Junction, Inc., next week will propose to eliminate CSMA/CD in its traditional form.

Since Gigabit Ethernet is expected to operate only over full-duplex links, which have separate transmit and receive channels, packet collisions will not be a problem. Daines is instead pitching the concept of a buffered gigabit repeater, which not only gives customers higher performance, but could be a cheaper entry point to Gigabit Ethernet.

A buffered gigabit repeater feeds traffic out onto the wire from one station at a time, arbitrating bandwidth contention and acting as what Daines calls CSMA/CD in a box.

"CSMA/CD was designed as a solution for a bus-oriented, half-duplex media, but the need for CSMA/CD out on a common media isn't there anymore," Daines said. "Just as Ethernet evolved from a bus to a bus in a box, I'd like to put CSMA/CD inside a repeater box."

Daines anticipated that his buffered gigabit repeater initially would be priced between $1,000 and $2,000 per port. By way of contrast, most vendors only plan to offer 1G bit/sec Ethernet switches, which are expected to start at about $3,000 per port.

Is it really Ethernet?

But opponents of Daines said it is important to include CSMA/CD in the Gigabit Ethernet standard — expected to be finalized in 1988 — because it is the access method shared by 10M and 100M bit/sec Ethernet. Without CSMA/CD at the gigabit level, many users will not see the technology as true Ethernet, and vendors are willing to take a performance hit rather than risk market rejection.

Daines claimed many vendors privately agree that CSMA/CD is no longer necessary in its original state, but most prefer not to publicly rock the boat.

"The Gigabit Ethernet group decided to adhere to CSMA/CD more out of fear than anybody actually wanting it," Daines said. "Vendors are too worried about whether people will still think it's Ethernet, rather than worrying about things that really matter — like performance."

Customers could get four or five times better performance with the buffer gigabit repeater as they would using the link-executed CSMA/CD because the work is done in the box, according to Daines .

But Howard Frazier, chairman of the IEEE 802.3 Gigabit Ethernet task force, said it does not look good for the buffered gigabit repeater.

"I don't think the buffered repeater has enough support to make it through the committee," he said. "Most people seem to just want to support typical collision domains."

Daines, however, said if the standards committee does not support his approach, customers may not be very impressed with Gigabit Ethernet's speed.

"If we can make a repeater box that actually delivers 1G bit/sec data rates, customers will love us for it once they understand it," he said. "Instead we may be forced into building a low-performance box purely for political reasons." ■

Gigabit Ethernet gains vary

Customers may not get the 10 times performance boost they expect with Gigabit Ethernet gear using the CSMA/CD algorithm as it is already defined.

- For small packets – typically found in NetWare environments – Gigabit Ethernet is about 2 times faster than 100Base-T.
- For large packets – typically found in CAD/CAM environments – Gigabit Ethernet is about 10 times faster than 100Base-T.
- Typically, networks have a mix of packet sizes that work out to an average where Gigabit Ethernet is about 5 times as fast as 100Base-T.

SOURCE: IEEE 802.3Z GIGABIT ETHERNET TASK FORCE

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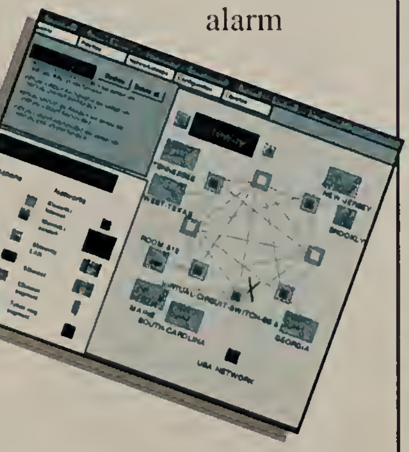

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NT Server

Continued from page 1

Perlow, a consulting engineer with New Technology Partners, Inc. in Bedford, N.H. "Microsoft has still got a lot to improve on in terms of a directory service and allowing users to better manage growing networks."

Windows NT will come from behind

Forecast of worldwide shipments of server operating environments (in thousands):

	NetWare	OS/2	Unix	Windows NT
1994	808	228	462	115
1995	923	299	531	393
1996	1,097	352	606	720
1997	1,197	403	688	965
1998	1,278	442	766	1,170
1999	1,344	457	845	1,360
2000	1,380	498	928	1,525

Users say the directory issue centers on the fact that NT Server uses a domain structure as the means by which administrators define user groups and give users access rights to services on any given network machine. An administrator can set up either a single master domain, comprising all the users and servers on the network, or multiple domains based on geographical or business distribution of the machines.

Although administrators can easily give users access to servers within their own domain, to grant access to servers within other NT domains requires administrators to define and manage trusted relationships between the domains.

George Ellis, a systems engineer with TransQuest, Inc., runs a 1,500-user NT Server 3.51 network that spans eight sites in the Atlanta area.

"Because of our physical corporate layout, we had to go with multiple domains. But it is this kind of setup that makes it very difficult to have fully centralized control over our networks," he said. Despite this shortcoming, he decided to go with NT Server because of the applications earmarked for NT and the future NOS capabilities Microsoft promises.

But Patrick Corrigan, president of The Corrigan Group, a network consulting firm in Tigard, Ore., recommended caution.

"Using multiple domains in a distributed environment is wrought with peril," he said. "If I give the manager of another domain access rights to the services within my domain, I lose control over who he passes those rights on to. That opens some pretty big security holes."

"Group management of NT Servers in large networks just isn't where it needs to be yet," said David Ellis, a systems analyst with Sandia National Laboratories in Albuquerque, N.M., which is moving toward NT primarily for its C2-level security and ability to interoperate with existing Unix boxes via native TCP/IP support. "Ultimately, I want a central database that has all the information about users and services on the network, and I want to be able to propagate that information to the workgroup servers so users know exactly where to get the services they need."

DIRECTORY TIES VIA ODSI

Microsoft Corp. recently released to beta the first component of its Open Directory Standard Interface (ODSI), a system that allows disparate directory services to interoperate. The beta can be downloaded from www.microsoft.com.

In answer to the various concerns, Microsoft trots out the same answer: "It's on the way."

The company has a long-standing statement of direction to deliver a full-blown directory service with Cairo — the next major release of Windows NT set for late 1997. Failover clustering capabilities for improved server availability are supposed to appear in part by year-end, with full clustering services — code named Wolfpack — coming to market sometime next year.

And in terms of reliability, Microsoft officials contend that each new version of the server operating system will be less likely to crash than its predecessor.

Phil Johnson, director of Unix and server operating environments at International Data Corp. in Framingham, Mass, predicts that in spite of Microsoft's moves to improve Windows NT Server as a NOS, the product in the future will continue to be used primarily as an applications server.

About half of the NT servers out there today are being used as network operating systems in workgroup or departmental settings, and the rest are used as applications servers in other network environments, Johnson said. "But in the future of the enterprise, we expect it will be an 80-20 split, with 80% of large corporate networks using NT strictly as an applications server," he said.

Johnson added that NT Server is starting to gain backing from the larger business applications vendors and grabbing the attention of in-house developers. ■

IBM

Continued from page 1

one outside of PSP [Personal Systems Products division that develops OS/2] cares at all about developing OS/2 applications for the enterprise," said William Zachmann, president of the Canopus Research, Inc. consultancy in Duxbury, Mass., and a former fierce OS/2 advocate. "At this point, IBM is being downright deceptive about its plans for OS/2."

"At this point, IBM is being downright deceptive about its plans for OS/2," says Canopus Research President William Zachmann.

Logica declined to go into the specifics of the agreement, but said Lotus was "looking for someone to share the risk of project-based SmartSuite development," said Howard Hall, an account team executive in Logica's IT vendor division. Lotus officials did not comment by press time.

"Through its behavior, it's like IBM is trying to force new or potential users away from using OS/2, but trying at the same time to appease users that have already made a substantial investment," said Mark Lillycrop, research director with the Xephon PLC consultancy in London. "It's really difficult to get anybody inside or outside to say anything positive about OS/2."

Adding to the mounting disinterest, IBM last week announced that it would be porting Netscape Communications Corp.'s Navigator Web browser to OS/2 Merlin, but only Version 2.02i, not the most recent 3.0 release.

"How many times can you be kicked in the head?" Zachmann asked. "Every self-respecting Windows user already has Netscape 3.0, and IBM just announces a beta for 2.0? This is just another pathetic example of how IBM continues to move OS/2 forward to the past."

Others noted OS/2's long history of failed projects, such as the Workplace OS and PowerPC duds of the past few years, as reasons to stay away. Both technologies were "revolutionary" software development technologies that fell by the wayside.

Wally Casey, vice president of client products with IBM, said the company was focused on getting the Netscape product on the market and will look at porting Version 3.0 in the future. He added that the company remains firmly behind OS/2, claiming it was critical to the success of many Fortune 100 companies.

IBM has a 32-bit OS/2 client in the wings and has talked about developing a thin client that exploits Java and other popular applications. But the consensus is these products are last of a dying breed.

"The OS/2 platform as a server has life, but as a client it's gone," said Shaku Atre, president of the Atre Associates, Inc., a consultancy in Port Chester, N.Y. ■

Sprint

Continued from page 1

riers to interconnect local SONET rings with Sprint's four-fiber bidirectional long-distance rings.

The goal of the B-MAN project is to extend Sprint's millisecond restoral capability in its network down to the last mile, plugging a gap that has so far prevented the carrier from turning its highly touted SONET capabilities into a tangible user benefit.

Sprint officials last week conceded the resulting SONET-to-the-building service in many ways will resemble AT&T's Accu-Ring service, which has been available for more than two years.

But the Sprint service will leapfrog Accu-Ring in at least two ways, according to Bob Runke, Sprint's vice president of access management. First, by linking Sprint's long-distance rings with local rings, the service will work end to end, not just within metropolitan areas. Second, the Sprint service will be a dual point-of-presence service, Runke said, meaning each local ring must ultimately connect with two Sprint POPs, adding an extra layer of diversity.

A Sprint service based on B-MAN is now being trialed in three markets, but carrier officials declined to name the markets or the beta customers. However, they confirmed the service will be available in markets where Sprint is the local carrier and in large metropolitan areas served by regional Bell operating companies.

John Holst, the national Accu-Ring offer manager, said that Sprint's plans aside, Accu-Ring offers the "best price in the nation" for a three- to five-year term dedicated-access commitment.

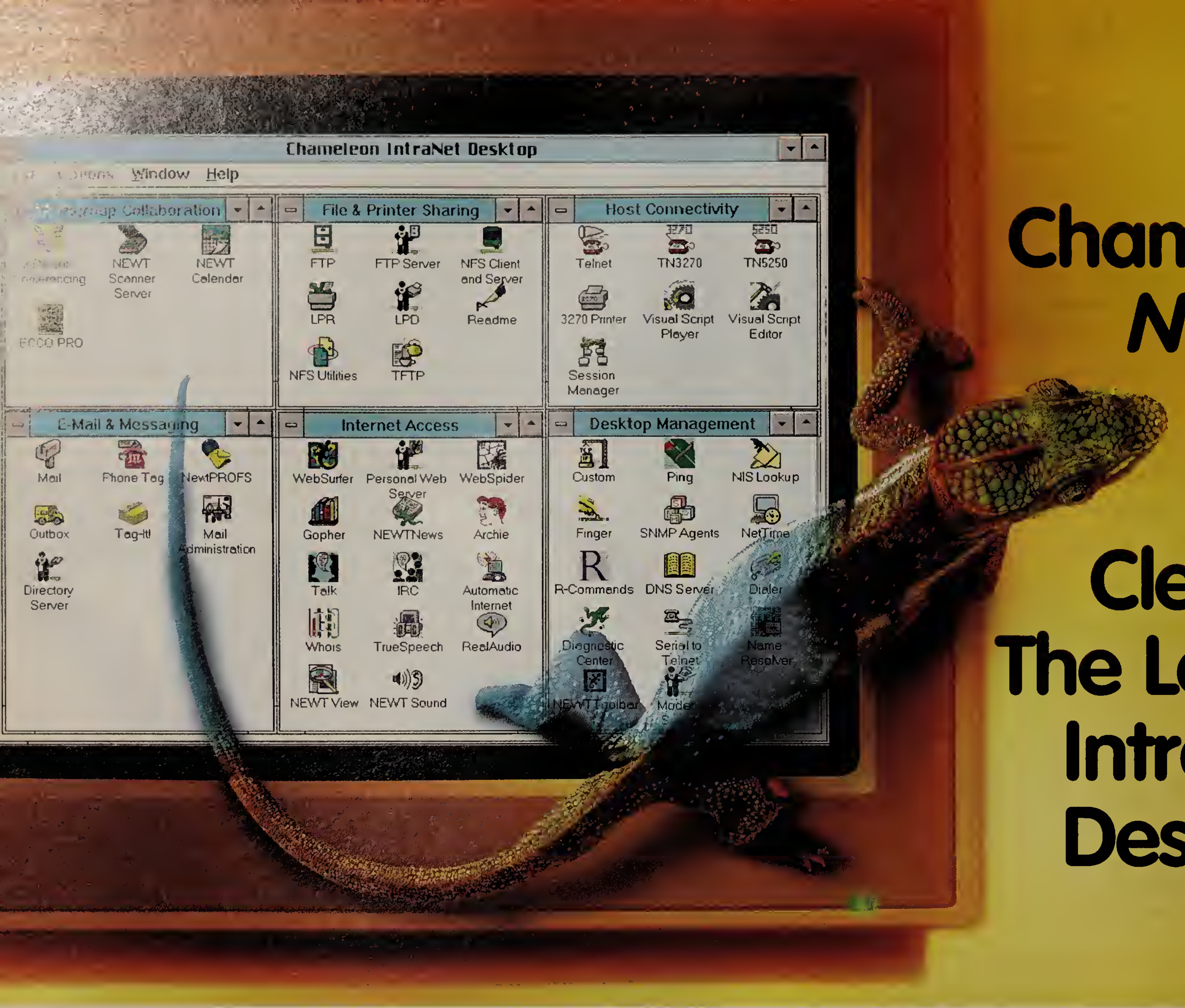
The service is available in every state except Alaska through rings constructed by a total of 19 local carriers, said Accu-Ring Product Manager Bill Matlock. It runs on DS-3, OC-3, OC-12 and recently added OC-48 rings, he said, and gives users the ability to carve out dedicated T-1 and T-3 transmission paths to AT&T's or even another carrier's POP.

Prices run as low as $40 a month after term discounts for a T-1 circuit and $600 for a T-3 circuit along the ring, orders of magnitude lower than the thousands of dollars users often pay for traditional dedicated access lines.

Although Accu-Ring can be provisioned to meet up at two AT&T POPs, the low prices are partially due to the option of going to a single POP, Matlock said. "Some customers will go out of their way to get multiple POPs on the ring, but it will cost more," Matlock said.

Runke and other Sprint officials said that even when publicly offered, their service will be provisioned on a market-by-market basis. "This will not happen overnight," Runke said. "Each vendor [local exchange carrier or competitive access provider] is on its own time frame." Widespread deployment is likely to occur only by mid-1997, Runke said.

Sprint expects to have 100% of its long-distance traffic on SONET by the end of 1997, said Fred Harris, Sprint's director of network planning and design. ■



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WANs & Internetworking

Covering: Network Architectures and Management • Routers • Muxes, Remote Access Gear, Modems, PBXs and other CPE • Mobile Computing Products

Briefs

■ **Larscom, Inc.** *will introduce at NetWorld+Interop 96 this month the IMUX-A45, an* **ATM inverse multiplexing** *module for its Orion 4000 broadband access multiplexer. The device allows users to bond the bandwidth from individual T-1 circuits to aggregate fractional T-3 circuits.*

The IMUX-A45 module will be available in January at a list price of $11,950. The base list price for the Orion 4000 is $6,550 and it is available now.

Larscom: (408) 988-6600.

■ *The Asymmetric Digital Subscriber Line arena has a new player: frame relay vendor* **FastComm Communications Corp.** *The company announced last week that it will introduce* **ADSL** *and High-speed DSL interfaces for its frame relay access devices. The new modules will be demonstrated this month at NetWorld+Interop 96.*

The products, as yet unnamed, are scheduled to ship in January, starting at $795.

FastComm: (703) 318-7750.

■ **IBM** *this week will enter the OEM* **networking chip market** *with nine chipsets it hopes will proliferate IBM technology in multivendor communications products. The networking chipsets include a 16x16 switch on a chip, ATM modules for PCI and ISA buses, as well a Token Ring and Ethernet products.*

■ **Eicon Technology Corp.** *last week announced it will package* **Microsoft Corp.'s NetMeeting software** *with Eicon's Diva family of ISDN adapters. The software allows groups of users to share applications, and the Diva adapters are designed for remote access by small remote offices.*

Prices range from $495 to $645, and the Diva products with NetMeeting will be available later this month.

Eicon: (514) 745-5500.

Remote access melds with NT Server

EdgeServer promises to give faster responses to remote users, tidier equipment racks.

By Tim Greene
Skokie, Ill.

U.S. Robotics last week announced that its Total Control Enterprise Network Hub can be fitted with a server hardware module to speed up remote access response time and reduce equipment room clutter.

The new EdgeServer Module, which runs Windows NT Server 4.0, can house frequently sought files at the access point to the network, reducing traffic on the headquarter's LAN.

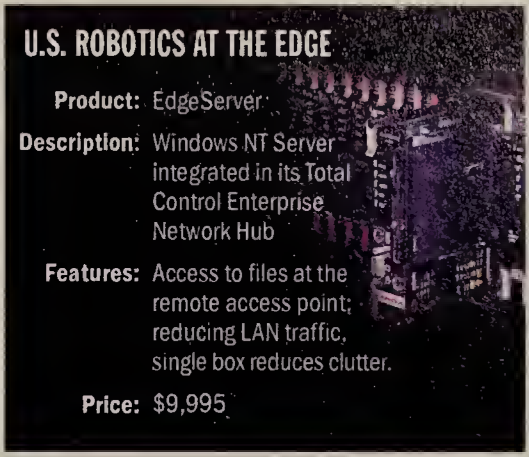
The server module was developed in cooperation with Microsoft Corp. to take advantage of NT features, including the ability to post Web pages, work collaboratively and authenticate remote users. The same capability could be used by small Internet Service Providers to improve response times for their users by posting frequently accessed pages from the World-Wide Web, the company said.

U.S. Robotics also announced PPP COP, the addition of Intel Corp. 80186 coprocessors to modems within the Enterprise Network Hub to boost the overall speed of the hub. PPP COP lifts the load of asynchronous character translation and cyclic redundancy check calculations for PPP packets from the server processor. PPP COP boosts the overall processing power of the hub to 1 GHz.

Greg Pfister, director of advanced technologies for Outreach Technologies, Inc. in Columbia, Md., said the server is a much cleaner alternative to the separate devices he would otherwise have to use: serial cables to a separate NT Server.

"All that mess can be done away with," he said.

Although Outreach has not tested it yet, Pfister said he expected performance increases from the Enterprise Network Hub because the server is integrated. The server module with a 486DX 100-MHz processor and 64M bytes of dynamic RAM, occupies two slots on the 16-slot Enterprise Network Hub, leaving the rest open to support as many as 48 individual dial-up lines with dual T-1 or Primary Rate Interface ISDN cards. The LAN side can be supported by a SCSI or Ethernet module.



U.S. ROBOTICS AT THE EDGE

Product: EdgeServer
Description: Windows NT Server integrated in its Total Control Enterprise Network Hub
Features: Access to files at the remote access point; reducing LAN traffic, single box reduces clutter.
Price: $9,995

Frequently accessed files can be stored on an 800M-byte hard drive in the server, and additional space can be added with a peripheral device connected through a SCSI port. Security within Windows NT protects the LAN.

In addition, the company announced its EdgeWare program, in which it certifies interoperability between EdgeServer and certain third-party applications including firewalling, caching, collaborative computing and Internet access.

EdgeServer costs $9,995 and will be available later this month.

©U.S. Robotics: (847) 982-5001.

Polaris weds mainframes to intranet, 'Net

By Michael Cooney
Beaverton, Ore.

Internet and intranet users looking to gain high-speed access to mainframe resources are the target of a package announced last week by Polaris Communications, Inc.

SNA Surfer will enable users to set up large, fast pipes between remote desktops and corporate data residing on IBM mainframes, according to Polaris.

See **Polaris,** *page 21*

Relay races to cache pages

By Joanie Wexler
Vienna, Va.

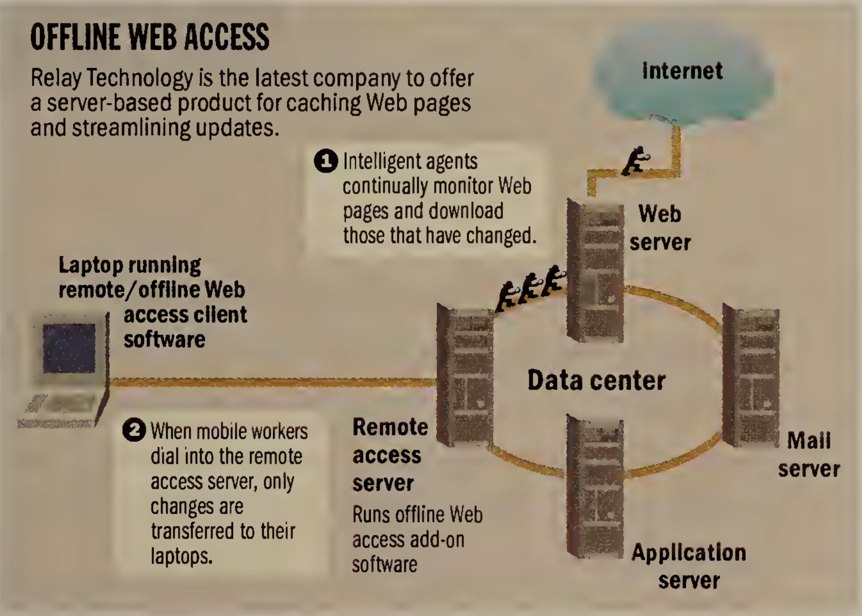
Another vendor is pledging to speed up mobile access to Web information.

Relay Technology, Inc. tomorrow plans to launch remote access software that caches Web pages, allowing users to tap into them offline at local disk access speeds. Relay/On-the-Go Web, costing about $100 a seat, is set to ship late this month.

Relay is following the lead of MobileWare Corp., IBM and Motorola, Inc., all of which announced server-based caching products in June (*NW*, June 10, page 8). MobileWare's software is slated to ship this month; the others are due out late this year.

Like other server-based Web access products, On-the-Go collects data from Internet or intranet pages that users download onto their laptops. The server continually monitors the Web for changes to these pages, and automatically captures those that are different. When users call into the server from the road, the new pages — compressed by a factor of 2 — automatically replace the versions on the laptops, explained George Pappas, Relay's vice president of marketing.

MobileWare's competing product, WebMirror Communications Server, adds a layer of filtering whereby only Web page changes are sent to the user, which further reduces connection time. The WebMirror server will also alert users that data has changed via paging or a cellular phone call, said Jack Blount, MobileWare president.


OFFLINE WEB ACCESS

Relay Technology is the latest company to offer a server-based product for caching Web pages and streamlining updates.

Internet
❶ Intelligent agents continually monitor Web pages and download those that have changed.
Web server
Laptop running remote/offline Web access client software
Data center
❷ When mobile workers dial into the remote access server, only changes are transferred to their laptops.
Remote access server
Runs offline Web access add-on software
Mail server
Application server

On-the-Go sports a feature called Connection-Based Scheduling — a way for users to specify whether they want updates sent to them at all, based on the urgency of the data and the speed and cost of the connection used, Pappas said. For example, users might elect to automatically receive only their company's internal inventory status if they are accessing the server over an expensive cellular link.

Client-only offline browsing products do exist, such as a version of MobileWare's product called WebMirror Personal, ForeFront Group's Web Whacker, Individual, Inc.'s Freeloader, and Traveling Software, Inc.'s WebEx. These cost about $30 each, and do not require any involvement by a net administrator. However, the client is responsible for the synchronization, a process that can last 30 to 60 minutes over analog dial-up lines for one Web page, Pappas claimed. With some products, such as Freeloader, the laptop can be otherwise unusable during this time.

Contact Relay at http://www.relay.com. and MobileWare at http://www.mobileware.com. ■

Microsoft Windows NT Server 4.0

lets you build

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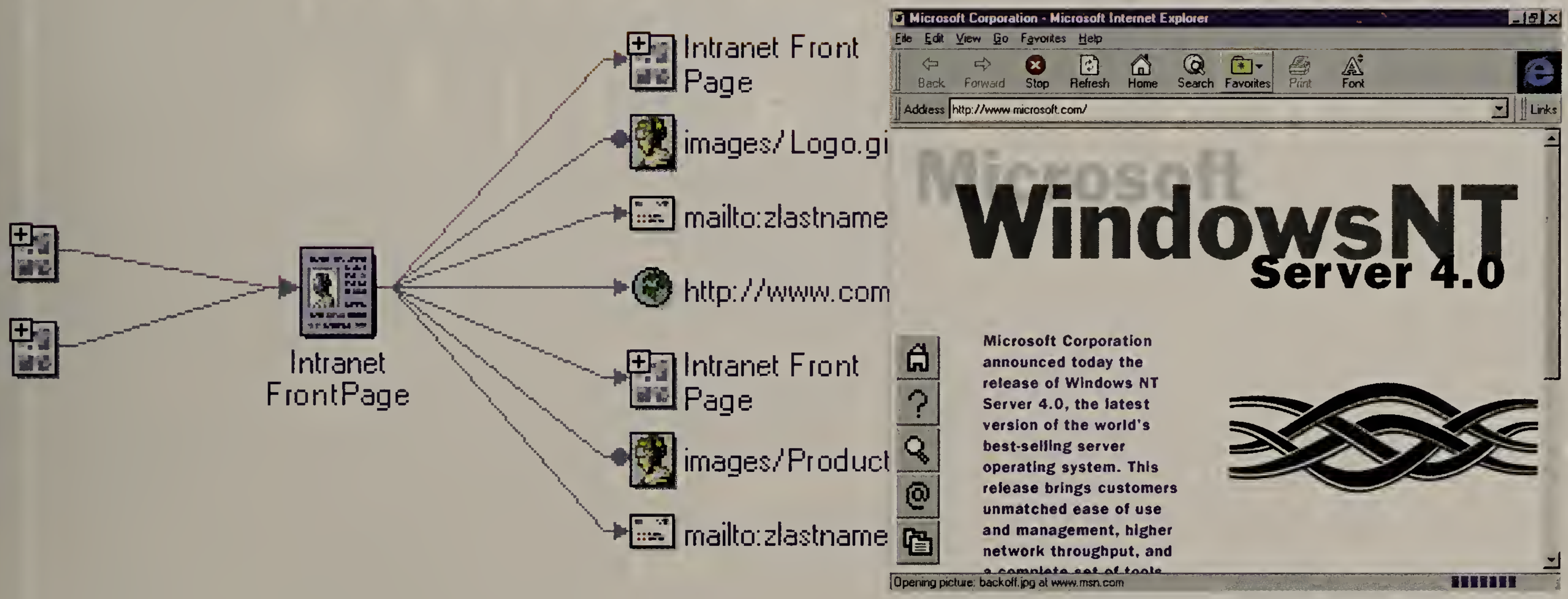
an intranet right in the comfort of your own network.


Intranet FrontPage
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images/Logo.gi
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Intranet Front Page
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mailto:zlastname
Microsoft Corporation - Microsoft Internet Explorer
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites Print Font
Address http://www.microsoft.com/
Links
Microsoft
WindowsNT Server 4.0

Microsoft Corporation announced today the release of Windows NT Server 4.0, the latest version of the world's best-selling server operating system. This release brings customers unmatched ease of use and management, higher network throughput, and a complete set of tools

Opening picture: backoff.jpg at www.msn.com

New Windows NT® Server 4.0 extends beyond file, print, application and communication services to offer a complete and integrated Internet and intranet platform. You can easily expand your existing network to include the Internet and intranet because Windows NT Server 4.0 comes with Microsoft Internet Information Server and Microsoft FrontPage web authoring tool included—and Microsoft Index Server is free off the Web.* Innovations like PPTP, MultiLink Remote Access and DNS make it even easier by offering you secure, flexible, high-bandwidth communication across the Internet. And, of course, Windows NT Server supports all standard Internet protocols so you're never locked in or left out in the Internet cold. Windows NT Server 4.0 performance is better too: It offers over twice the network throughput and is 35% more scalable than Windows NT Server 3.51. Most importantly, Windows NT Server is easy to use. With features like the Windows® 95 interface and wizards that automate common administrative tasks, you can move on to more important things, like lunch. If eating somewhere other than at your desk sounds like something you'd be interested in, take a closer look at Windows NT Server 4.0 at our Web site.

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INTERNETWORKING MONITOR

Of sealing wax, kings and knaves

The Internet is in the postcard stage of evolution. Almost all communication over the Internet is as private as messages written on postcards, and anyone who can intercept a message can read it. The 'Net is not even to the envelope stage, where communication is protected from the casual observer.

This seems a bit strange since the desire to protect communication is not a new one. In days of old, paper missives were sealed with wax and an embossed design to protect against opening and indicate if the protection failed. The protection was not complete: Kings had the right to look and knaves could divert.

Scott Bradner

People have been trying to protect net communications since before there was a 'Net. The first encryption projects started in 1975 — even before TCP/IP. Encryption goes one better than wax seals; even intercepted messages cannot be read. But this is a feature that worries governments of all types, and they keep trying to "fix" this feature. The latest effort is detailed by Stewart Baker in an article in the Sept. 1996 *Wired.* He reports that many governments, including the U.S., are again pushing key escrow (renamed "trusted third-party encryption" to protect the guilty), now using the forum of the Organization for Economic Cooperation and Development in Paris.

Key escrow is a good idea for business. Imagine your treasurer encrypting all the company books in a secret key, then getting his third dimension revoked by a truck. The business could be in for a real hard time unless that key is hidden away someplace safe. But it can be another story when it comes to individuals, particularly in some parts of the world. Many people in many governments (including the U.S. government) would just as soon ban the use of encryption protocols where a key is not kept by a third party for the "protection of the people."

Along the same line, in recent congressional testimony a National Security Agency (NSA) official was quoted as saying that a Certificate Authority (CA), which may be used to build a particularly promising security infrastructure, needs to know the private encryption key of an individual to perform its task.

Since this is not true, one can only hope that the quote was a misunderstanding. The alternative is that the NSA wants messages sent by anyone using such a CA to be able to be read or forged by the people running the CA (or anyone with power over the CA).

On the other side, the Internet Architecture Board and the Internet Engineering Steering Group have issued the appropriately numbered RFC 1984, *IAB and IESG Statement on Cryptographic Technology and the Internet* (ftp://ds.internic.net/rfc/rfc1984.txt), exploring some of the issues.

For any of you worried about the above trend, John Gilmore has started an ambitious project to develop a more secure Internet. The aim of the project is to secure 5% of Internet traffic against passive wiretapping in 1996, 20% in 1997 (against both active and passive attacks), and 80% in 1998. Details of the project can be found at http://www.cygnus.com/gnu/swan.html.

The ability to protect messages has progressed far beyond sealing wax, to the point that the knave can be reliably thwarted. It remains to be seen if the kings will permit the law-abiding to use the technology (the lawless already do).

Disclaimer: Some might claim that the lectures of some Harvard professors are already encrypted, but I know of no official university position on the issue.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

Polaris

Continued from page 17

"We are looking to bridge the communications gap between the corporate data that still mostly resides on IBM mainframes and the Internet, where users need access to those resources," said Iraj Vojdani, president of Polaris.

The SNA Surfer package includes Polaris' System 2000 mainframe channel-attached gateway, which is bundled with Microsoft Corp.'s Windows NT Server, SNA Server and Internet Information Server (IIS) software. It also contains wide-area networking support in the form of a router board provided by Sourcecom Corp.

The System 2000 is a Pentium-based device that lets PC users attach directly to the IBM mainframe channel either via IBM's fiber-based Enterprise Systems Connectivity (ESCON) or traditional copper bus and tag links. ESCON operates at 17M byte/sec, and bus and tag links run at 4M byte/sec.

Analysts said the package should reduce the complexity of accessing IBM mainframe databases for remote users.

"In SNA terms, users won't need a 3270 terminal or need to know how to maneuver inside DB2; SNA Surfer will handle that," said Lynn Nye, president of the NetResults consultancy in Portland, Ore.

SNA Surfer will be available this month for $25,000.

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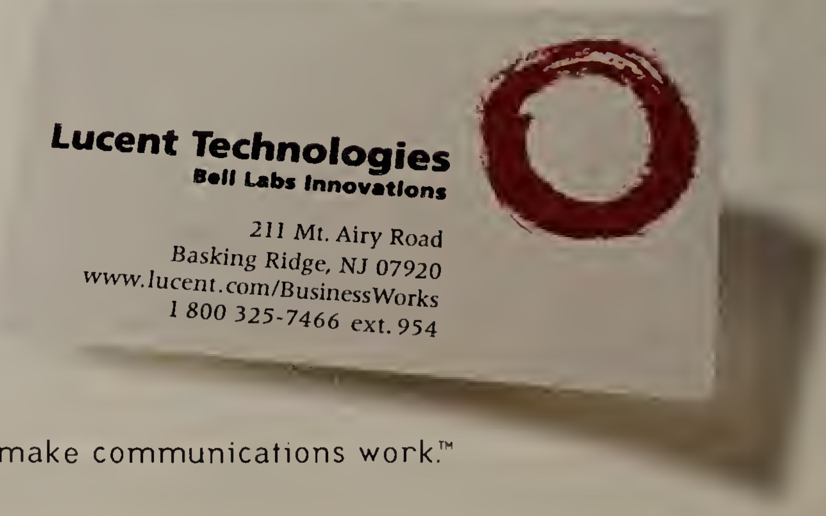

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Carrier Services

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Briefs

■ **BellSouth Corp.** *last week launched BellSouth.net, an* **Internet access** *service for residential and business customers. The service will be supported by IP networks set up in 10 markets. It will also be used to support Commerce-Link, a service that sets up closed user groups to allow networking of businesses with their branch offices and customers. Internet access is available in Atlanta and New Orleans, with Miami; Raleigh, N.C.; Charlotte, S.C.; Orlando and Jacksonville, Fla.; Louisville, Ky.; and Nashville and Memphis, Tenn., opening up in October.*

■ **NYNEX Corp.** *started formal trials of* **Asymmetric Digital Subscriber Line** *last week with employees of Lotus Development Corp. One Lotus employee in Cambridge, Mass., is hooked up to an ADSL line, but the trial calls for 60.*

■ **Bell Communications Research** *is offering consulting services to local telephone companies worldwide to improve the reliability and performance of their networks that are congested from* **Internet traffic.** *Bellcore said it will help the companies design more robust networks around managed trunking, intelligent network routing and numbering, Asymmetric Digital Subscriber Line, cable modems and other technologies to avoid local net overload.*

Bellcore: (800) 521-2673.

■ **MCI Communications Corp.** *expanded its emerging nationwide* **wireless footprint** *by signing an interconnection agreement with NextWave Telecom, Inc. of San Diego. NextWave won 63 personal communications services (PCS) licenses at the most recent Federal Communications Commission auction, covering a potential population of 110 million.*

High-speed digital networks

AT&T hones, reorganizes InterSpan services

Company readies higher speed services, automated billing and other features amid sales philosophy shift.

By Joanie Wexler

Basking Ridge, N.J.

Automated billing, higher speeds, disaster recovery and other improvements to AT&T's InterSpan packet data offerings will be rolling out throughout the rest of the year, according to company officials.

These features are emerging amid subtle organizational changes within AT&T that blend frame relay and ATM into one network with different endpoint choices.

Hindman is overseeing AT&T efforts to:

- Combine ATM and frame billing on a single system
- Create packages of mixed frame and ATM services
- Launch fractional T-3 and T-3 frame services; 155M bit/sec ATM
- Offer ATM disaster recovery options and SVCs

The InterSpan group has melded responsibilities so that, for example, a sales representative can jointly sell ATM and frame as end points in a common network to serve a customer's varying needs.

This month, a new homegrown billing system that serves both frame relay and ATM customers will go live, according to Steven Hindman, InterSpan product management director. Its effects will show up on customers' October bills, he said.

Until now, he said, frame relay and ATM bills have used private-line terminology that has been difficult for users to apply to packet-switching networks. "We've been more manual than we'd like to be," he said.

The new system should prevent errors for new customers or new ports ordered by existing customers, according to Hindman.

What's the difference?

The common billing platform reflects moves within AT&T to merge frame relay and ATM services as generic high-speed data options.

"In every bid, the customer expresses concern about how he will migrate from frame to ATM," Hindman said. "We want to take away that 'either/or' worry."

This is a message all carriers will eventually be putting out, noted Christine Heckart, director of broadband at TeleChoice, Inc., a consulting firm based in Verona, N.J.

"They do not want the user to choose a network based solely on which one is cheaper," she said.

So AT&T, for example, has chosen to make its port and permanent virtual circuit prices the same for both frame and ATM.

Still, "we have some noodling around to do" when the company begins offering multiple ATM classes of service, Hindman noted. For now, AT&T offers constant bit rate ATM services only, at T-1 and T-3 speeds.

Eventually, the InterSpan group will package combinations of frame relay and ATM services as part of the new philosophy, according to Hindman.

More speed to come

Later this year, AT&T will add 155M bit/sec as a speed option to ATM, both on the access side and within the ATM backbone—the fruit of an AT&T government contract.

On the frame relay side, AT&T plans to introduce fractional T-3 and T-3 services.

In addition, worldwide mobile dial services using modems and ISDN access to the frame relay portion of the network are in beta test now and could be available as early as the fourth quarter, said Darrell Sagehorn, an AT&T product manager. That effort is part of the AT&T WorldPartners initiative.

Ron Toth, who was ATM product manager until the recent reorganization, added that a managed ATM service, whereby the carrier bundles ATM equipment and manages that equipment, will soon join the managed frame relay offering under the AccuWAN umbrella of managed network services.

Read up on other recent changes within AT&T on Network World Fusion. Select News+.

Network World Fusion
http://www.nwfusion.com

He said the company is testing disaster recovery options with users, as well as switched virtual circuits for both frame relay and ATM. ■

High security

GTE to help keep ATM traffic secure

By Tim Greene

Users that want to run wide-area ATM traffic over a public ATM service but are concerned about security have a new option. At least they do if their network falls in an area served by GTE Corp.

GTE last week introduced an ATM encryption service supported by InfoGuard 100, a device GTE developed jointly with Cylink Corp. for government use.

The service can encrypt at speeds as high as 34M bit/sec, and requires installation of InfoGuard at all points where sensitive user traffic enters the public ATM cloud.

Users have the option to buy the boxes or lease them as a component of the ATM service.

Each unit has two full-duplex DS-3 interfaces and employs the Data Encryption Standard (DES) algorithm. Each session is protected by a single public key.

"Some users are extremely concerned about security, but the real question is whether the cost of protecting the data is greater than the cost of the risk of losing it," said Steve Taylor, president of Distributed Networking Associates in Greeensboro, N.C.

Encryption for GTE's ATM

GTE can offer encryption of ATM traffic using Cylink's Infoguard 100.

Speed:	As high as 34M bit/sec
Security:	DES algorithm with a 56-bit key. One key is generated for each session.
Price:	$750 - $1,000 per month more than the basic ATM service

Taylor said for most traffic traversing a public packet network, the security offered by permanent virtual circuits is sufficient. But when switched virtual circuits become common, that could change.

"At that point you have to worry about whether the person setting up the call is the right person," Taylor said.

Mohammed Peravian, chairman of the ATM Forum working group on security, said a standard for encryption is being developed but will not be ready until next year.

The standard being considered includes DES encryption, he said. Signaling authentication in the control layer, a different type of security, will also be standardized, he said.

The service is available in 14 states. Users can buy InfoGuard devices at $39,950, or purchase the encryption as part of an ATM service (see graphic).

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Local Networks

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Briefs

■ *Start-up* **Packet Engines, Inc.** *of Spokane, Wash., last week announced the first customers of its* **Gigabit Ethernet** *media access controller (MAC). The technology, which is the core component required to develop Gigabit Ethernet switches, is being licensed to* **MMC Networks, Inc., UB Networks, Inc. and XLNT Designs, Inc.** *In addition to licensing the technology to other vendors, Packet Engines plans to develop its own products based on the MAC.*

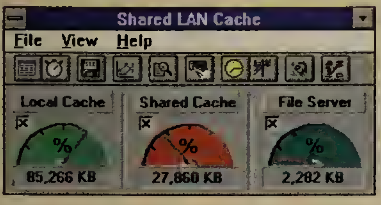
Packet Engines: (509) 922-2190.

■ **Xylan Corp.,** *a LAN switching vendor in Calabasas, Calif., last week announced its new* **PizzaPort port-switching hub** *for customers not quite ready for full-blown switching. The 36-port Ethernet device allows customers to assign any Ethernet port to one of four internal Ethernet segments. Each of these segments is then switched by an OmniSwitch or PizzaSwitch device.*

PizzaPort is available now for $3,600.

Xylan: (818) 880-3500.

■ **Measurement Techniques, Inc.** *of Stoughton, Mass., last week rolled out* **Shared LAN Cache,** *which can boost network performance by as much as 300%.*



By using Shared LAN Cache, a file is automatically cached the first time it is read, and when a user later requests the same file, it comes from the Shared LAN Cache instead of the file server. This approach boosts net performance by eliminating redundant requests over the network.

Pricing for Shared LAN Cache starts at $2,995 for 25 users.

Measurement Techniques: (617) 344-6230.

LAN switching to take center stage at Interop

Digital, Agile, HP and Madge roll out new switching wares.

By Jodi Cohen
Atlanta

Judging from the onslaught of LAN switching announcements, the upcoming NetWorld+ Interop 96 trade show will be the place to be for checking out the latest in Ethernet, token-ring and ATM switches.

Just last week, Digital Equipment Corp., Agile Networks, Inc., Hewlett-Packard Co. and Madge Networks, Inc. rolled out new switching gear that will be on display at the show this month.

NETWORLD+INTEROP 96 10th ANNIVERSARY

Digital announced enhancements to its 3-year-old DEChub 900 switching hub, including new Ethernet and ATM switch modules and a backplane upgrade that more than doubles the box's capacity.

The VNswitch 900 modules provide full wire-speed switching performance and offer virtual LAN support. In addition, the switches support IP switching and distributed routing.

Digital offers several 12-port versions of the VNswitch modules, including switches with two Fast Ethernet ports, one ATM port and one FDDI port, and a 24-port pure Ethernet switch.

For ATM connectivity, Digital unveiled the ATMswitch 900, which brings ATM's performance and quality of service features to department and workgroup environments. The ATMswitch has six 155M bit/sec ATM ports and two modular PHY interfaces.

Agile will use Interop to demonstrate how it has made good on its promise to port Layer 3 VLAN capabilities to multivendor ATM networks (*NW*, Feb. 26, page 1).

The new ATMizer LS Layer-3 LAN Emulation Server brings Agile's automated VLANs to other vendors' switch and edge devices, including equipment from Cisco Systems, Inc., Fore Systems, Inc., 3Com Corp., Bay Networks, Inc. and Whitetree Networks, Inc. The server is a five-port device that offers five 155M bit/sec ATM ports and connects to other ATM end-stations, routers, workstations, servers and edge devices that comply with the ATM Forum's LAN Emulation (LANE) 1.0 standard.

The ATMizer LS server is aimed at customers that want Layer 3 VLAN capabilities as well as LANE service benefits such as multicast control, but cannot yet get them from their current vendor.

In related news, HP last week rolled out three Ethernet switching hubs and a switch module for its popular AdvanceStack hub designed to make it easier for workgroups and remote offices to migrate to switching.

HP's new AdvanceStack hubs come in 12- and 24-port managed and unmanaged versions and include two expansion slots for a switch and management module. By inserting a switch module, customers can transform a shared Ethernet hub stack into a switched environment. Users will be able to take advantage of new features such as port switching, autoconfiguration and load balancing as well as Remote Monitoring.

Not to be left out, Madge announced enhancements to its RingSwitch token-ring backbone switch. Added features include support for source route transparent bridging, broadcast control, full RMON support and FDDI and ATM uplinks. ■

Check out the latest LAN switching gear at NetWorld+Interop

Company	Product	Pricing	Availability
Agile	ATMizer LS LAN Emulation server for third-party vendors' switches	Starts at $39,995	October
Madge	FDDI module for RingSwitch token-ring switch	$5,990	Now
	RMON license for RingSwitch	$1,450	Now
	ATM uplink module for RingSwitch	$5,950	1997
Digital	12-port Ethernet switch modules with high-speed uplinks for DEChub 900	Start at $8,395	October
	Six-port 155M bit/sec ATM switch modules for DEChub 900	Starts at $12,995	December
HP	AdvanceStack switching hubs	Start at $849	November
	AdvanceStack Ethernet switch module	$949	November

Banyan bolsters position

By Christine Burns
Westborough, Mass.

Banyan Systems, Inc. this week will make good on its promise to deliver a version of its enterprise directory service that runs on Windows NT Server, and also detail the latest revision of its VINES network operating system.

Together these announcements encompass Banyan's strategy to hold on to its existing customers that have grown accustomed to VINES services — namely the StreetTalk directory — while trying to cash in on the momentum behind Windows NT.

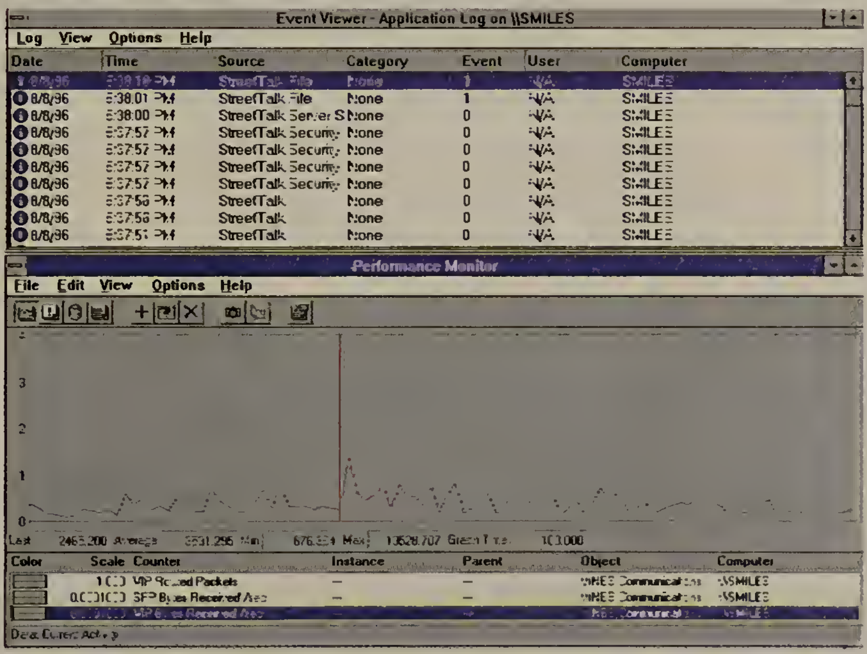
"Users want to deploy Windows NT to run applications, but its primary weaknesses as a server platform are the administrative hassles involved with maintaining multiple NT domains," said Shaun Hayes, a product manager at Banyan.

"If you deploy StreetTalk on top of NT, then you get a single point of administration for multiple NT, VINES or Unix servers and clients," he said.

Larry Stouder, director of technical development at Continental Grain Co. in New York, said his company is interested in Windows NT Server to run business applications.

"But we have been using VINES for 12 years and are used to the seamless access to all network services that StreetTalk gives us and aren't willing to sacrifice that for NT," Stouder said.

Banyan's StreetTalk for Windows NT will run as an application on a Windows NT 3.X or 4.0 server providing file and print services and access to all network services registered in the StreetTalk directory. For better administration, it will ship with Banyan's new StreetTalk Explorer, a 32-bit Windows-based graphical tool that helps administrators configure and manage distributed StreetTalk directory services and access to those services.



```
8/8/96  5:38:01 PM  StreetTalk File      None  1  N/A  SMILES
8/8/96  5:38:00 PM  StreetTalk Server S  None  0  N/A  SMILES
8/8/96  5:37:57 PM  StreetTalk Security  None  0  N/A  SMILES
8/8/96  5:37:57 PM  StreetTalk Security  None  0  N/A  SMILES
8/8/96  5:37:57 PM  StreetTalk Security  None  0  N/A  SMILES
8/8/96  5:37:57 PM  StreetTalk Security  None  0  N/A  SMILES
8/8/96  5:37:56 PM  StreetTalk           None  0  N/A  SMILES
8/8/96  5:37:56 PM  StreetTalk           None  0  N/A  SMILES
8/8/96  5:37:51 PM  StreetTalk           None  0  N/A  SMILES
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Banyan's StreetTalk Explorer *helps administrators configure and manage StreetTalk directory services throughout a distributed network.*

See Banyan, *page 27*

WIRED WINDOWS

Notes from the War Zone Take II

Time for another look at the war for the hearts, minds and pocketbooks of computer and network users.

When last we looked at the network computer front, (*NW*, July 2, 1996), Microsoft Corp. and Oracle Corp. were battling for the desktop. The $500 Internet device was a hot topic and Oracle's NC specification was in the headlines. Since no one's figured out how to build the NC for under $500 yet, that idea appears to be stillborn.

The battle in this war is moving off the desktop and onto your kitchen counter.

Netscape Communications Corp. is the latest to try to build an operating system for all of the electronic devices in your home, from the toaster to the TV set-top box. Microsoft tried this with the "Windows Everywhere" initiative a couple of years ago and garnered pretty much zero support.

Novell, Inc., with its NetWare Embedded Systems (NEST) program has had more success, at least with traditional LAN peripheral manufacturers. The upcoming release of Novell Distributed Print Services (NDPS) in NetWare 4.11 relies heavily on NEST technology. The winner here, though, is going to be the first company to market a network interface to the office coffee machine.

The NOS front

The network operating system (NOS) war has recently seen the release of a new soldier — Microsoft's Windows NT 4.0. As a secret weapon, it was no secret and doesn't amount to much of a network weapon.

And Novell has announced InterNetWare (the first product with three embedded capital letters!), which isn't so much a new product but a rebundling of existing products. In fact, the description of InterNetWare is a lot like that of NetWare 4.11 when it was still called Green River.

Dave Kearns

IBM, in the meantime, continues its stealth marketing campaign for OS/2 Warp Server, which quietly and methodically is becoming the best built NOS on the market.

Banyan Systems, Inc. has shown it isn't ready to fade from the battle by releasing StreetTalk for NT. If you insist on making NT your enterprise NOS, then StreetTalk is a must-have for even minimal access control and security. Novell has demonstrated NetWare Directory Services for NT, but there won't be a product until early 1997. Microsoft appears to have abandoned directory services in favor of building monthly releases of Internet Explorer.

Microsoft is also getting hit hard by Netscape for the license on Windows NT workstation limiting access to no more than 10 clients. There's no way to enforce this as an administrator, so the best solution would appear to be to not deploy NT workstation. I don't think that's what Microsoft intended, although it does claim the limit is in your best interest so the operating system isn't overtaxed by all those accesses. (It neglected to mention how NT server overcomes this limitation.)

Tip of the week

Anyone who has used Novell's NSEPro or ServiceWare, Inc.'s Network Support Expert CD-based infobases knows the value of the Folio search engine. Now Folio Corp. has released Web Retriever, an offline URL viewing and retrieval package that automatically constructs infobases from downloaded Web pages. You can download this No. 40 product from http://www.folio.com/.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. E-mail him at dkearns@msn.com.

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10. Learn the direction of intranet-based groupware

v'96.2!
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12/5/96	Atlanta, GA	12/6/96
12/10/96	San Francisco, CA	12/11/96
1/21/97	Morristown, NJ	1/22/97
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NET RESULTS

Growing data means more HSM

As a network user, you are constantly inundated with information about things like high-speed LAN technologies, frame switching and ATM. Integrating and managing these technologies has nightmare potential written all over it.

But something even more frightening is lurking below the surface: data. The amount of data being stored in LAN environments is growing at an alarming rate. If your network is typical, LAN data is amassing at an annual rate of 55%, and that means you're facing a very serious storage issue.

Skip MacAskill and Melinda Le Baron

To date, vendors have been unable to convince users of the benefits of hierarchical storage management (HSM) technology. We estimate that the total number of HSM systems installed on LAN server platforms to date is less than 5,000. However, even a relatively small network can benefit from the use of HSM technology.

The first iteration of HSM products for LANs was a failure. HSM software and systems were expensive, complex and poorly integrated with other storage and data management software (e.g., backup solutions and virus protection software).

While many of the integration issues have been addressed, the high implementation costs and general lack of understanding of the HSM benefits remain obstacles for most LAN administrators. These issues are exacerbated by the steep decline (approximately 30% annually) of hard disk prices during the past few years that has resulted in net managers simply adding more server disks as needed.

That approach, however, is a Band-Aid solution that does not consider the labor and downtime costs associated with adding disks to servers, or the costs of managing ever-increasing volumes of data.

The time spent on a variety of management tasks can be significantly reduced by use of HSM. One such task is resolving the "disk full" or "disk near full" condition, which — without an HSM tool — is likely to be a completely manual exercise.

A LAN manager in this situation has three choices: Add disk space to the servers; use HSM; or archive the inactive data.

Since 70% to 80% of data on distributed platforms is inactive, archiving is an attractive option.

Archiving involves removing data from primary storage (the disks) and moving it to offline storage (generally tape). It does not, however, automate the retrieval process when data is needed again. And the storage management packages typically used for archiving do not identify inactive data. In addition, even if the inactive data has been identified, manually doing something with it is time-consuming.

HSM systems, on the other hand, identify inactive data and automatically move it to near-line storages. This also automates the retrieval process.

HSM, however, does have some potential pitfalls. Other utilities that act upon the data stored on the primary drives, for example, must be aware of the HSM system. Backup software that does not recognize file stubs, which are the pointers to the data on the HSM system, will recall each file as the file is opened for backup. The same problem can be encountered with antivirus utilities.

We recommend purchasing an HSM system from the same vendor that provides LAN backup.

You have to remember that HSM is not a substitute for backup software. HSM is merely a piece of a total storage strategy that can increase the efficiency of backup and, once implemented, ease data and storage management.

MacAskill is a senior research analyst and Le Baron is a research director in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 316-1111 or at inquiry@gartner.com.

Banyan

Continued from page 25

In addition, the product will include support for long Windows NT file names, TCP/IP client support for Windows 95 and NT Workstation, and VINES IP support for integration into existing VINES networks. "With the way that the industry is moving toward NT, it really was a basic requirement for Banyan," said Will Zachman, president of the Boston-based consultancy Canopus Research, Inc. "But I think most people who go completely to NT will hold out for the directory services promised by Microsoft," he said.

Patrick Corrigan, president of the Corrigan Group, Inc. in Tigard, Ore., said Banyan has actually provided an easy migration path to an exclusively NT network. "If [VINES] users were thinking about a move to NT before, they are thinking harder about it now because StreetTalk for NT gives them an interim directory solution until Microsoft gets around to delivering one of its own."

But Banyan officials said they are not abandoning VINES development and backed up that statement with details about VINES 7.0. This revision will include StreetTalk Explorer for increased manageability, better client-side TCP/IP services, support for disk drives larger than 2G bytes, and international and long file names.

StreetTalk for Windows NT will be available at the end of the month with prices ranging from $2,995 for a 10-user license to $9,995 for a 100-user license.

©Banyan: (508) 898-1000.

Briefs

■ **Open Port Technology, Inc.** *last week annouuced* **Open Port Automated Fax Deliver (AFD),** *client/server software that routes faxes across corporate private networks before off-loading them to the public network. Depending on the network, this can turn long-distance and international fax calls into local calls. Open Port AFD runs on Windows clients and Unix servers, and will ship in the fourth quarter. Pricing was not available.*

Open Port: (312) 867-5000.

■ **Lotus Development Corp.** *last week announced that a version of Lotus Notes for the U.S. military's Defense Message System (DMS) has successfully completed the first of several significant* **government conformance tests.** *Lotus is among a handful of messaging vendors selected for testing in fulfillment of the contract for the Department of Defense's DMS, which will replace its current communications systems. Customers can now buy Notes from Lockheed Martin Corp. under the DMS contract, and upgrade to the DMS version for a nominal fee when it becomes available.*

Lotus: (800) 346-1347.

NOTES DMS

Lotus has finished these government conformance tests so far:

- ✓ **X.400 transport**
- ✓ **X.500 directory**
- ✓ **Messaging security**

■ **WebFlow Corp.** *last week announced its* **SamePage Suite,** *intranet groupware for Windows NT. The suite consists of two application modules built around au object architecture. SamePage is a live shared workspace, and Take Action is an action item management system.*

Both modules are integrated with an E-mail notification system that alerts users when documents change or need to be reviewed. SamePage runs on Windows, Macintosh and Unix clients, as well as Windows NT servers. Pricing will be announced when the product ships in October.

WebFlow: (408) 236-1400.

SAP's R/3 scheme is pragmatic and cautious

By John Cox
Philadelphia

SAP America, Inc.'s plan to transform its widely used R/3 business applications software into a set of distributed components will likely be scorned by object-oriented technology purists.

But then, not many purists are deploying networked applications that support core business functions such as human resources, logistics and financials.

SAP executives formally unveiled the SAP Business Framework last week before some 9,000 users gathered here for the annual North American users conference. At the same time, they described details of the December release of R/3 3.1, which will incorporate the first elements of the Business Framework to allow R/3 to be integrated with Web applications.

SAP began introducing object concepts with R/3 3.0 last year. In essence, the underlying R/3 business processes are represented as software objects — a bundle of business logic, processes and functions — stored in a repository and accessed and manipulated via published interfaces, called Business Application Programming Interfaces (BAPI). Some 180 BAPIs will be part of Release 3.1, nearly all aimed at allowing Web clients to access R/3 functions, logic and data.

The objects can be linked using several messaging technologies, including SAP's Application Link Enabling (ALE) and SAP Business Workflow. Both of these conform to Microsoft Corp.'s Common Object Model/Distributed COM. SAP will eventually support the Common Object Request Broker Architecture.

By replacing SAP's proprietary internal communications links with ALE and COM, each SAP module can be addressed in a standard way, both internally and externally, according to Harry Tse, research director at The Yankee Group in Boston.

The change will further enhance SAP's sophisticated application-level integration, according to Tse. Rival vendors typically integrate applications by sharing a common database.

SAP, by contrast, provides a much more powerful business process integration that lets SAP modules directly create extended conversations with each other, according to Tse.

But the Business Framework falls far short of a true object-oriented application architecture, according to Michael Kennedy, an analyst with META Group Inc. in Stamford, Conn. "These 180 interfaces may give SAP more flexibility in shipping new functions faster and more easily," he said. "But they won't be fine-grained enough to help customers reengineer their business processes."

SAP is being pragmatic and conservative in adopting object technology, acknowledged Peter Zencke, a member of SAP AG's executive board. "No one really knows if it's possible to adapt [pure] object technology for enterprise business applications, such as a work order," he said.

©SAP: (610) 725-4500.

How SAP will roll out its Business Framework components for R/3

Dec. 1996 – R/3 Release 3.1 will include:

- ▶ More than 25 Internet Application Components for functions most commonly needed in Web applications, including product catalog, order status, internal requisitions and ad hoc financial reports.
- ▶ Application Link Enabling/Web: Extensions to the ALE messaging technology to support Web interactions between Internet Application Components and R/3 applications.
- ▶ Internet Transaction Server: Works with Web server to provide transaction services, scalability and security.
- ▶ About 180 Business APIs will be used by R/3 and third-party applications to access R/3 business processes and data.

Q3 1997 – R/3 Release 4.0 will include:

- ▶ Human Resources component, with its own database and product release cycle; new HR features can be deployed when ready.
- ▶ Product Data Management component.
- ▶ Treasury Management component.
- ▶ Dedicated Report Server, for high-performance, enterprisewide reporting and decision support applications.
- ▶ R/3 Engineering Workbench, a set of graphical tools for configuring and managing R/3 business processes.

NCR rolls out Top End tools for Internet

By Kristi Essick
Dayton, Ohio

NCR Corp. has announced an enhanced version of its Top End transaction request broker that lets developers link existing business applications and objects to the Internet or corporate intranets.

Get more info on Network World Fusion, including articles on:

- ● **Microsoft's TP and middleware plans**
- ● **BEA Systems' Java application for marrying the Tuxedo TP monitor to the Web**
- ● **UniKix Technologies' CICS-Internet gateway**

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The announcement adds ActiveX remote client support to Top End's existing Java client capability, which was unveiled in June when the company announced plans to make all of Top End's supported applications accessible through Web browsers.

Top End enables users to access services, including database-stored procedures; horizontal applications, such as Oracle Corp. Financials; or a Windows NT, Unix or MVS application from any client, including a Web browser.

Top End manages communications between clients and servers in applications such as banking and point-of-sale networks.

The middleware also redirects transactions to avoid system failures, whether the failure occurs at the server, application or network level.

The product currently works with most major databases and Oracle client/server applications, but NCR plans to extend functionality in the coming year to include client/server applications by Baan Corp., PeopleSoft Corp. and Dun & Bradstreet Software.

The added 'Net capabilities are aimed at helping companies running services on several servers and trying to tie their disparate IT services together across the Internet, company officials said.

NCR also introduced the Service Interface Repository, which allows programmers to click on an object registered in the SIR and securely connect the object to applications written in Java or ActiveX, such as Microsoft Excel.

Trial versions of the enhanced Top End product will be available this October via the World-Wide Web at http://www.ncr.com/product/topend.

The trial kit includes business objects for banking, hotel, inventory and ordering, database access and horizontal application access.

Top End bundled with ActiveX and Java will ship in the first quarter of 1997, and cost about $2,700 per server. The Java client is available for free download from the Top End Web site.

©NCR: (513) 445-5000.

Essick is a correspondent for IDG News Service.

HOW TP MONITORS IMPROVE INTERNET ENVIRONMENTS

- ▶ Cuts application development time by allowing developers to exploit browsers
- ▶ Brings transaction management to electronic commerce applications
- ▶ Can detect and reroute transactions to avoid systems failures

SHARED LOGIC

E-mail vendors finding strength in numbers

Software.com, Inc. and a series of partners have found strength in numbers, emerging as viable contenders for the corporate electronic messaging dollar.

The relationships among players such as Netscape Communications Corp., Coordinate.com, Inc. and Software.com are examples of the way in which vendors selling best-of-breed products can take advantage of open component models to quickly put a more comprehensive product on the market.

For example, Netscape uses Post. Office, the Software.com messaging server. Software.com takes advantage of Coordinate.com's StreetTalk directory, and Coordinate.com resells Post.Office as the message store for its BeyondMail client. As a result, these companies are on their way to putting together a complete product for the enhanced messaging market in much less time than was required for Lotus Development Corp. and Microsoft Corp. to develop Notes 4 and Exchange, respectively.

Daniel Blum

Coordinate.com is targeting the consumer and business markets with a Post Office Protocol 3 (POP3)/Simple Mail Transfer Protocol version of BeyondMail, Post. Office and directory offerings based on StreetTalk.

Software.com's mission is to provide high-performance messaging products that scale from the smallest to the largest enterprise. "Messaging servers *are* rocket science," insists Valdur Koha, president and chief operating officer of Software.com.

Recently, Software.com announced a deal to pair its messaging server with Qualcomm, Inc.'s popular Eudora shareware client.

Since Qualcomm and Coordinate.com are rival E-mail client vendors, and both compete indirectly with Netscape, their relationships with Software.com represent co-opetition at its finest.

Who's driving these companies to form such shifting, nonexclusive relationships? The customer, of course. Users want best-of-breed architectures but usually buy integrated solutions. Open interfaces only take you so far.

For example, you could run Eudora against Post.Office using POP3 and SMTP, but might lack amenities such as an E-mail directory. OEM relationships provide the glue to patch the seams.

As always, let the buyer beware. OEM relationships are inherently impermanent. Netscape, for example, is gradually designing Post.Office out of its newer Mail Server products.

Faster development means faster change, and faster change introduces reliability, support, and product and skills obsolescence issues. To reduce risks, consider the following:

- ■ Are your principal messaging suppliers financially and organizationally stable? Do they understand the needs of your company and the market?
- ■ What will it take to swap out or upgrade any particular product component of your messaging system?
- ■ Have the component vendors provided a road map for joint upgrades?
- ■ Do they deliver coherent, courteous and accessible customer support?

In many ways, the risks inherent in basing your messaging infrastructure on best-of-breed products are less than those involved in going with a single vendor.

Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached at dblum@interramp.com.

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Where does Internet mail fit?

Companies view SMTP-based mail systems as a replacement for proprietary offerings.

By Barb Cole

Already straining to migrate LAN-based mail systems to the client/server realm, companies must now figure out where Internet mail fits into the equation.

Internet mail systems are growing explosively, largely due to end users calling for tools to communicate with people outside company boundaries.

The result is that many firms are putting off E-mail upgrades and are eyeing the 'Net's Simple Mail Transfer Protocol as a mail backbone. In addition, mainstream mail vendors are scrambling to incorporate Internet protocols into their flagship products, and a spate of new messaging products built from the ground up to run on Internet protocols are emerging.

"We're seeing a lot of people who were all ready to make a move to [Microsoft Corp.'s] Exchange, [Lotus Development Corp.'s] Notes or another proprietary messaging system taking a wait-and-see approach," said Tim Sloane, an analyst at Aberdeen Group, Inc., a market research firm in Boston.

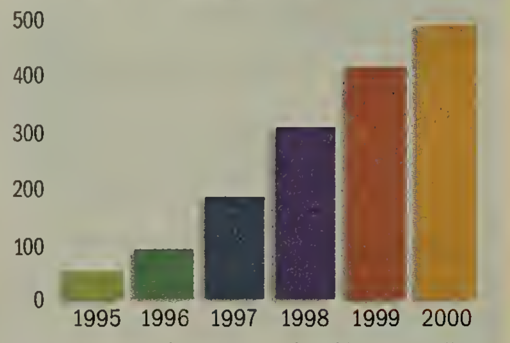
Paul Rarey, head of information systems security and technical architecture at Clorox Services Co., the IS division of the Clorox Co. in Oakland, Calif., said he's confident that moving the company's 4,000 Lotus cc:Mail users to a system that supports SMTP and Internet Messaging Access Protocol (IMAP) Version 4 is the way to go. He said he is less clear, though, on whether to exploit the Internet capabilities of Lotus Notes or move to an SMTP-based mail product.

"What Lotus is talking about doing [with SMTP and IMAP4] looks good, so I'll wait and see," Rarey said. But one piece of the Internet mail puzzle still confounds Rarey. "I haven't seen any vendor clearly articulate how it will deal with end-to-end security," he said.

Most likely, Clorox will go with a mixture of native Internet mail products and proprietary offerings, according to Rarey. "A Netscape [Communications Corp.] mail server may be great as an Internet messaging router because it switches 'Net mail very fast," he said. "But you don't want Notes or Exchange doing that because the products have a lot of additional baggage."

Other areas of the business may require more capabilities than just SMTP routing, and that is where those proprietary systems fit in, he added.

FORECASTING HUGE REVENUE GROWTH FOR INTERNET E-MAIL SOFTWARE



Based on worldwide revenues in millions of dollars.

SOURCE: IDC, FRAMINGHAM, MASS.

"A mix-and-match scenario [blending proprietary and Internet mail products] is becoming possible because vendors are implementing the Internet standards instead of simply providing gateways," Rarey said.

Move slowly

While companies are embracing Internet mail for reasons such as scalability, they are moving slowly because Internet mail offerings lack the rich functionality of many proprietary offerings.

Indeed, basic mail capabilities, such as sending attachments with messages, are not always guaranteed with Internet mail systems. And despite widespread vendor plans to adopt the Lightweight Directory Access Protocol (LDAP), most 'Net-based mail offerings today lack a solid directory. The traditional low cost of mail systems based on Internet protocols is less of a draw now that most proprietary messaging vendors have lowered prices substantially.

Further clouding things, the mainstream messaging vendors have big plans to support Internet protocols, but "haven't quite nailed down how they will integrate with the Internet environment," said Aberdeen Group's Sloane.

Nonetheless, a number of companies are evaluating SMTP-based mail systems as an alternative to proprietary systems.

"We not only want to clean up our messaging environment internally, but we want clean connections to the outside," said Bob Stevens, manager for Internet/intranet, groupware and collaborative computing services at BellSouth Corp. in Birmingham, Ala.

BellSouth is moving about 45,000 IBM PROFS and Digitial Equipment Corp. All-In-1 users to Hewlett-Packard Co. OpenMail running on an SMTP backbone. "If you look at the proprietary systems, there's more functionality. But the Internet mail standards are improving," Stevens said.

Several industry groups, including the Internet Mail Consortium, are working to improve the Internet's core messaging protocols and ensure interoperability between the products that support these protocols.

According to David Ferris, principal at Ferris Research, Inc., a San Francisco-based market research firm, there is not one right approach to fitting 'Net mail into the corporate messaging backbone.

"If a company has a massive investment in NetWare and cc:Mail, suddenly moving to Internet mail would be a big mistake," Ferris said. Conversely, if a firm has a TCP/IP network and is not committed to a proprietary messaging system, moving to an Internet-based mail system might be the right decision, he said.

While some firms are rushing to implement SMTP as a backbone mail technology, others are viewing Internet mail as an adjunct to the core messaging infrastructure

"As a company, we're moving to the Internet cautiously," said Jon Whitford, manager of collaborative technologies at Avery Dennison in Diamond Bar, Calif. The company is replacing about 6,000 cc:Mail seats with Lotus NotesMail.

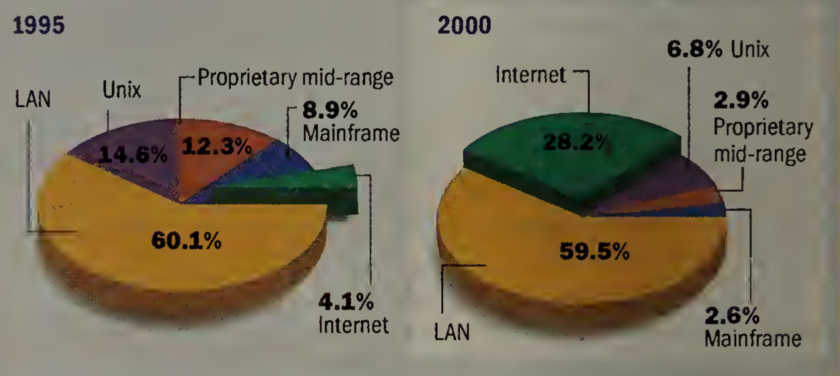
"We're allowing people to use Internet mail, but we're not pushing it as a corporate standard," Whitford said. Instead, the company is "waiting for the capability to connect to the Web directly from Notes."

Overall, Internet-based mail will be a good fit for the evolving desktop applications of most companies, analysts said. "Most of us will be logging into some HTML Web page on our desktop. Internet mail will offer good integration with the new IP networks and desktops," said Ron Rassner, an analyst at Creative Networks, Inc., a Palo Alto, Calif., research firm. "If all these (applications and mail systems) are based on 'Net standards, it makes sense," Rassner said.

What's less clear, according to Rassner, is whether to choose a messaging system that has been built from the ground up to run on the 'Net or opt for a proprietary system that has been given Internet hooks. ■

INTERNET E-MAIL SOFTWARE MARKET

By the year 2000, E-mail software geared for use with the Internet will be the second-leading segment of the E-mail software market.



Based on revenues of $1.06 billion

Based on forecast revenues of $1.72 billion

SOURCE: IDC, FRAMINGHAM, MASS.

Software.com revs 'Net mail server

Software.com, Inc. last week upgraded its Internet mail server by adding features designed to make the server easier to manage.

With Post.Office 2.0, mail administrators may now limit the size of a user's mailbox as well as the size of messages that may be delivered to a mailbox. The new version also enables gateways to run on the same machine as the mail server, and can share user names and passwords with Windows NT.

The new version also has enhanced error handling so that postmasters may determine why mail has been queued.

In addition to making Post.Office easier to administer, the company is trying to make the software easier to buy. To that end, it is offering a free Post.Office license for 10 users, according to Valdur Koha, president and chief operating officer of Software.com.

The promotional offer is part of the company's aggressive push to penetrate the nascent Internet mail space. Software.com has already licensed Post.Office to Netscape Communications Corp., NetManage, Inc. and Coordinate.com.

Koha said the company is on an aggressive upgrade schedule for its popular mail server.

A version of Post.Office that supports Internet Messaging Access Protocol Version 4, Microsoft Corp.'s Messaging Application Programming Interface and the Lightweight Directory Access Protocol is due by year-end. That upgrade will also include Coordinate. com's Universal StreetTalk directory, Koha said.

Post.Office 2.0 for Windows NT is available now; a Unix version will ship next month. Beyond the 10 free users, pricing for Post.Office ranges from $14.90 per user to $1.99 per user, depending on the number of seats.

Software.com: (805) 882-2470.

—Barb Cole

Intranets & the 'Net

Covering: Internet Technologies and Services
for Collaboration and Electronic Commerce

Briefs

■ **Nombas, Inc.,** *this week will launch ScriptEase WebServer Edition, a software product for developing Web pages using the company's own scripting language. Data typing, memory management and* **garbage collection** *are handled automatically. The tool also features an integrated development environment and a remote debugger for pinpointing Common Gateway Interface scripting errors.*

ScriptEase runs on nine platforms, including Windows NT, Windows 95 and OS/2. Pricing ranges from $145 to $1,295. The software can be downloaded from www.nombas.com.

Nombas: (617) 391-6595.

■ **Infospace, Inc.** *has started shipping WebSeQueL, a report generator in the form of a* **Java applet** *that resides on a central Java-based server for producing reports and graphics from back-end databases. The reports can be viewed, saved or delivered in HTML, Java charts and tables, .GIF, Virtual Reality Modeling Language and comma-delimited files.*

Infospace: (415) 655-3700.

■ *This October,* **Cadis, Inc.** *plans to ship Version 2 of its Krakatoa* **content management** *and search software with improved graphics for display over the Web with a Netscape Communications Corp. Navigator 2.0 browser. Krakatoa, written in Java, starts at $25,000 and is available for Sun Solaris, HP-UX and NT servers.*

■ **Harbinger Corp.** *has acquired* **Comtech Management Systems, Inc.** *as part of a strategy to supply federal government agencies with* **electronic data interchange** *software under the Federal Acquisition Streamlining Act, which mandates electronic commerce. Harbinger Chairman and Chief Executive Officer Tycho Howle said Comtech was purchased for its experience in government contracting.*

Howle

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Cable TV industry gets ready for EDI prime time

EDI eliminates discrepancies by mapping information to back-end systems.

By Ellen Messmer
New York

The cable TV industry is getting ready for a fall season lineup that will feature a more robust electronic data interchange specification for buying and selling advertising spots.

Advertising titans TN Media and Grey Advertising already buy loads of 15- and 30-second spots from cable networks such as Turner Broadcasting and ESPN — for everything from *Larry King Live* to *The Andy Griffith Show* reruns.

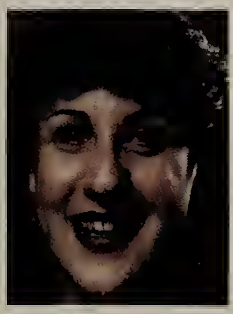
EDI is not completely new to broadcasting. Agencies often make bulk airtime buys using an EDI purchase order, buying an entire *James Bond* movie week, for example. However, the EDI trading relationship has not evolved to the point that they can handle the huge volume of media-slot changes that occur in the fast-paced TV world.

Learn more about X12K, the EDI specification being used by the cable industry, on Network World Fusion. Select News+.

Network World Fusion
http://www.nwfusion.com

"Agencies will often take one of the 30-second slots and split it to be two 15-second slots," said Carl Goodin, director of EDI services at Turner Broadcasting System, Inc.'s sales division. "But our systems aren't set up to handle this level of detail — *Larry King* spot ads all look like one line of data, not two. So we haven't been able to do any sort of contract changes with EDI," he said.

Consequently, the changes agreed to by phone are still input manually after being faxed in by the agency, a process that can introduce costly mistakes. In contrast, with EDI, new information is mapped directly to back-end systems, and errors seldom occur.



TN Media's *Sperling*

"The major goal is to eliminate discrepancies," Goodin said. "If I send you an invoice and it doesn't match the original, the agencies won't pay for the entire contract." The cable TV industry hopes to flip to a better channel with a set of EDI technical specifications and management guidelines to be issued by the Cable EDI Committee for processing order changes and acknowledgments.

The committee is part of the New York-based Cable Television Advertising Bureau.

According to Helene Sperling, vice president of systems and operations at TN Media and Cable EDI Committee cochair with Goodin, other media, such as newspapers and magazines, could also make use of the EDI specifications. The cable TV industry expects to see EDI prototypes from companies such as Management Sciences Associates, Inc. this fall. Goodin said cable TV networks are upgrading their internal line-order databases so they can automatically input purchase order changes.

With the volume of EDI messages between agency and cable TV networks increasing, the industry is now looking at the Internet to carry the traffic instead of a value-added network. "The committee is evaluating the Internet to send EDI," Goodin reiterated. ■

Cable TV biz plugs into EDI

The EDI Cable Committee plans to release technical specifications for the cable industry and its advertisers. Members include:

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Datatech Software
Discovery Communications
Donovan Data Systems
E! Entertainment Television
ESPN
Grey Advertising
International Family Entertainment
Leo Burnett Co.
Lifetime
Management Science Associates
MTV Networks
Televest
TN Media
Turner Broadcasting
USA Networks
Zenith Media

The Internet

Meridian lets Web play CDs

By Carol Sliwa

Meridian Data, Inc., this week will focus its attention on intranets with the announcement of a hardware/software combo for accessing CD-ROM information via Web browsers.

With CD IntraNet, due for general release late next month, multiple PC users will gain simultaneous access to CD libraries and databases with a simple click of a hypertext link.

The CD-ROM information can come from traditional Windows- and DOS-based CDs as well as HTML-formatted CDs.

"The CD-ROM file structure is not compatible with the browser technology, and what Meridian has been able to do is make that incompatibility transparent. They've been able to make the conversion for the user," said Bob Abraham, vice president of Freeman Associates, a management consultancy in Santa Barbara, Calif., that covers data storage.

Stanford University's library systems department has been testing the Meridian product so it can serve up CD-ROM reference materials to seven machines in its chemistry library. But the university has broader plans to set up Internet kiosks in the main library and various branches.

MERIDIAN JOINS THE INTRANET CRAZE

Features of Meridian's CD IntraNet:

- Launches Windows & DOS CD applications from Web pages
- Manages network connections
- Manages CD applications, access, metering
- Server based — No client software needed
- Includes Web page templates
- Includes Web application launcher applets

"There would no longer be a need to enter the chemistry library at night with a key," said Glenna Nesmith, computer systems network analyst for Stanford's library systems department. "They could do it from a computer sitting in their lab or in a dorm room or in their office."

Included in the Meridian system is server hardware that can handle a maximum of 56 CD-ROM drives, CD-ROM networking software and Web application launching software.

It also comes with Microsoft Corp.'s NT Workstation Version 3.51 software, Netscape Communications Corp.'s FastTrack Web server software and Netscape Communications Corp.'s Navigator browser.

Meridian will make two versions of CD IntraNet: a 14-drive system, called CD IntraNet 914, that is expected to sell for $16,000, and a 56-drive model, CD IntraNet 956, priced at $27,000.

CD IntraNet supports clients that run on Windows 95, Windows NT Workstation and Windows for Workgroups.

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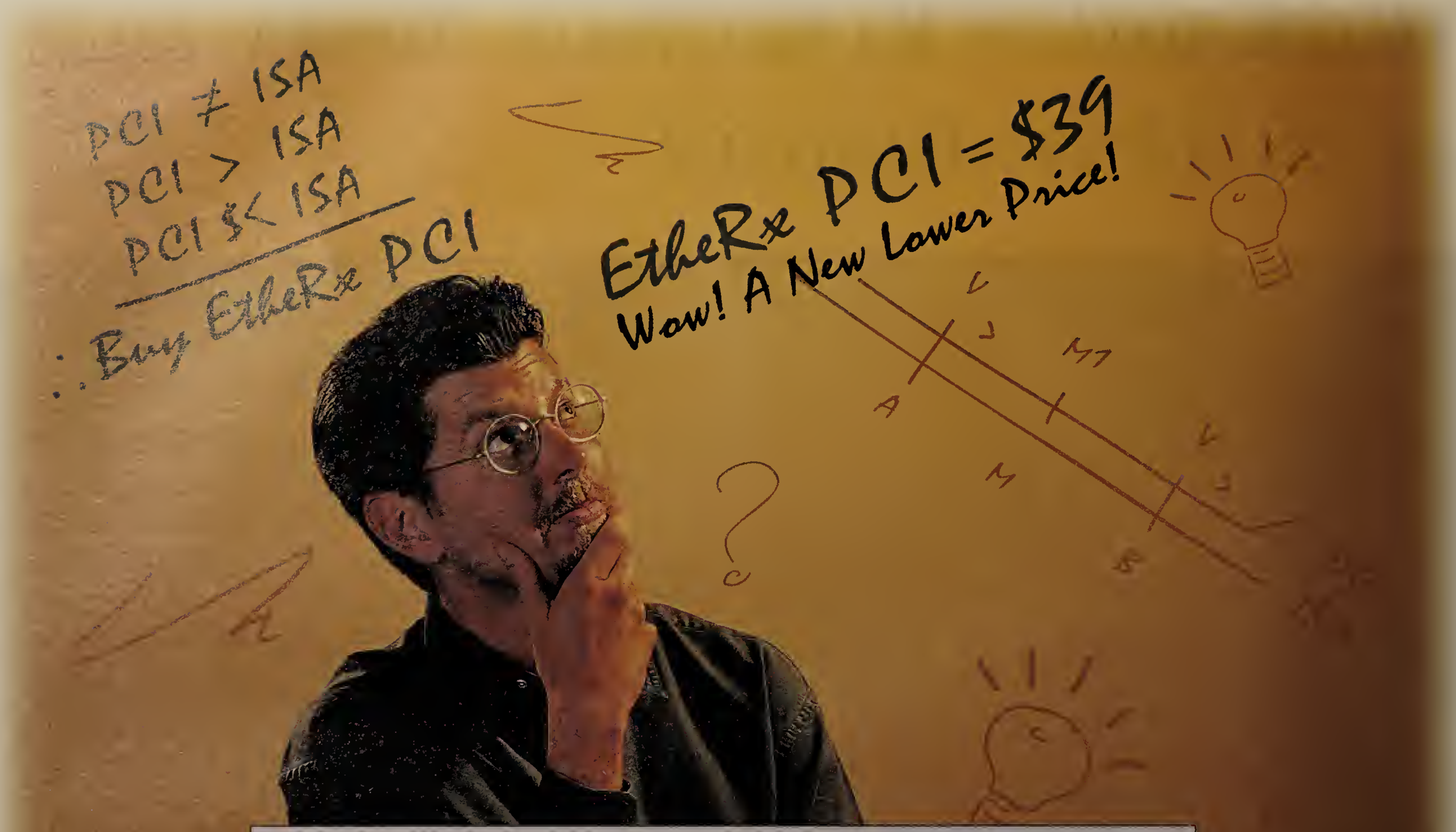

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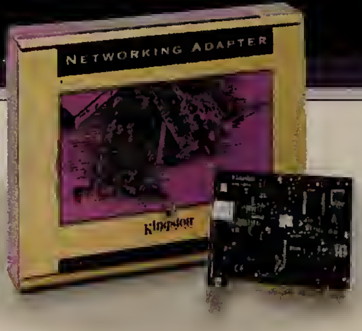

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Technology Update

Keeping Up with Network Technologies and Standards

High-speed local nets require new generation of SNMP polling

Polling procedures that effectively monitor older types of networks may yield inaccurate results when applied to new network technology, such as ATM and 100M bit/sec Ethernet.

By Charles Dellacona

The heart of today's network analysis is the gathering of SNMP data from agents scattered across the network. The data must be gathered periodically, or polled, to determine trends in network behavior over time and analyze such performance characteristics as port utilization.

Because device polling is done in the background, most network managers don't give it much thought. This needs to change when deploying high-speed networks such as ATM and 100M bit/sec Ethernet.

A primary consideration in SNMP polling is deciding which objects will be queried and at what time intervals. The time interval will vary for different objects.

For example, the Management Information Base II (MIB-II) object sysDescr, a string describing the agent, changes infrequently; it only needs to be queried daily. Objects that track packets or octets change frequently and need to be polled often, sometimes more than once an hour.

Querying rapidly changing objects as often as possible is important, since frequent polling gives network managers a more accurate representation of actual behavior.

However, querying at too high a rate adds unnecessary network loads and may actually affect the statistics being polled. So, in determining a polling schedule the highest feasible frequency for querying without causing data loss has to be defined.

Calculating counter lifetimes

Each item returned by an SNMP agent is referred to as an object. Counter objects simply represent event occurrences, such as the number of octets or bad packets received on an interface. A counter's lifetime is the length of time required for it to assume all possible values.

When polling SNMP counter objects, designers must pay attention to their lifetimes and poll them at least that frequently. If the object is not polled frequently enough, the analysis will be invalid.

Take, as an example, an SNMP-manageable Ethernet switch with four twisted-pair ports and an agent that provides the standard MIB-II objects for each port.

To determine the port utilization on an hourly basis, three MIB-II objects are necessary: ifSpeed, a gauge that estimates the interface's bandwidth in bits per second; ifOutOctets, a counter of the octets transmitted by the interface; and ifInOctets, a counter of the octets received by the interface.

If interface utilization is defined as the sum of the input and output divided by maximum possible traffic over a given period of time, then ifOutOctets and ifInOctets can be polled at time t1 and again after some period at time t2 and the average utilization for that time interval calculated.

The majority of SNMP objects are implemented as 32-bit variables. When an object changes more than its variable can describe, it is said to wrap, much like the odometer in a car will wrap after it has gone 99,999 miles.

To report port utilization on an hourly basis accurately, polling must be frequent enough to guarantee that no counter object ever wraps between polls.

To do this, the minimum wrap time for each object must be determined.

In the case of ifOutOctets and ifInOctets, the question is: How quickly can Ethernet supply 4,294,967,295 octets (the largest change a 32-bit variable can describe) and thus, cause one or both counter objects to wrap? Polling slightly more quickly than this time allows for an accurate result.

Here's where the speed of the network changes things. A 10M bit/sec Ethernet connection translates to 1.25 million octets per second, while 100M bit/sec Ethernet corresponds to 12.5 million octets per second.

To provide accurate results in all cases, it is necessary to assume full utilization. Given that the maximum octet traffic is related to the speed of Ethernet, it is possible to calculate how long the Ethernet will take to transmit or receive the 4,294,967,295 octets causing the statistics to wrap.

In the 10M bit/sec case, the wrap time is slightly more than 57 minutes, 15 seconds.

In the 100M bit/sec case, it is slightly more than 5 minutes, 43 seconds. So polling intervals longer than the wrap time will produce invalid data.

It is technically challenging to create a polling engine that can poll hundreds of devices, each with dozens of ports, within as little as five minutes — or lower in the case of ATM — and not induce unnecessary SNMP traffic. As media speeds continue to increase, polling engines with simplistic static polling schedules become inadequate.

Currently, some vendors provide alternative objects that are expressed in coarser values (kilooctets instead of octets). These make lifetimes somewhat longer at the expense of some imprecision.

Also, the SNMP standards committees are discussing the use of 64-bit counters that would make counter lifetimes 4 billion times as long and effectively eliminate the problem.

This work, however, may be several years away.

In the meantime, there is still an entire industry populated with devices using 32-bit counters.

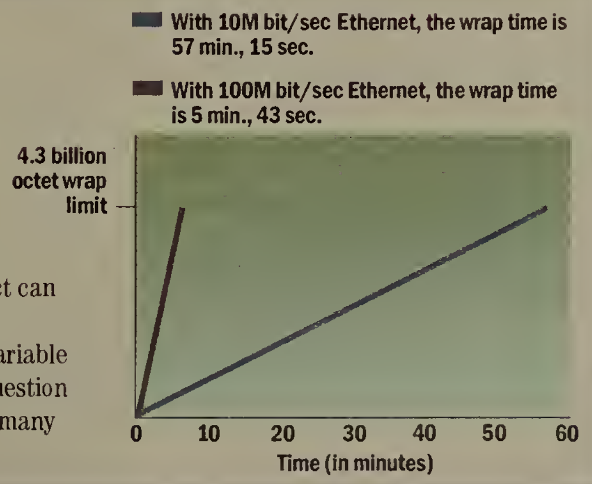
Network managers and SNMP application implementers must be aware of the requirements introduced by these new high-speed networking technologies and select products and strategies that fulfill them.

Dellacona is cofounder and chief technical officer of Nashua, N.H.-based 3DV Technology, Inc., a company that provides software-based network management tools. He can be reached by phone at (603) 595-2200, Ext. 224 or via the Internet at charlie@dddv.com.

UP CLOSE

How network speed affects polling

SNMP agents record events and return the results as 32-bit counter objects. When events change more than the object can describe, it is said to wrap, rendering it inaccurate. The largest change a 32-bit variable can describe is 4.3 billion octets, so the question is, how quickly can Ethernet supply that many bits before wrapping occurs?



NETWORK HELP DESK

Network World *tracks down answers to your questions. Please submit them to Chris Nerney via phone at (800) 622-1108, Ext. 451, the Internet at cnerney@nww.com or fax at (508) 820-1103.*

We are running a NetWare 3.12 file server with a 2G-byte SCSI hard drive, a 4G-byte SCSI 4mm tape drive and a SCSI controller. We have two network cards in the file server, which has 32M bytes of RAM. We have approximately 25 nodes on the local network.

We have to take this file server down every week or two to free system resources. Are there any settings we should include in our STARTUP.NCF or AUTOEXEC.NCF files to help optimize our hardware so we don't have to down the server so often?

Michael Hall, PC systems administrator, U.S. Probation Office, District of Kansas

The first thing to do is apply the Novell, Inc. NetWare 3.12 patch kit (312PT8.EXE) to your server, says Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area.

Look at the updates listed on the PATLST.TXT file on Netwire or Novell's Web site to see what others need to be applied.

Depending on the tape backup software you're running, you should consider adding at least another 16M bytes of RAM.

The best performance in general can be obtained when a NetWare server is running with cache buffers at a 60% level or higher with all modules needed for server operations loaded.

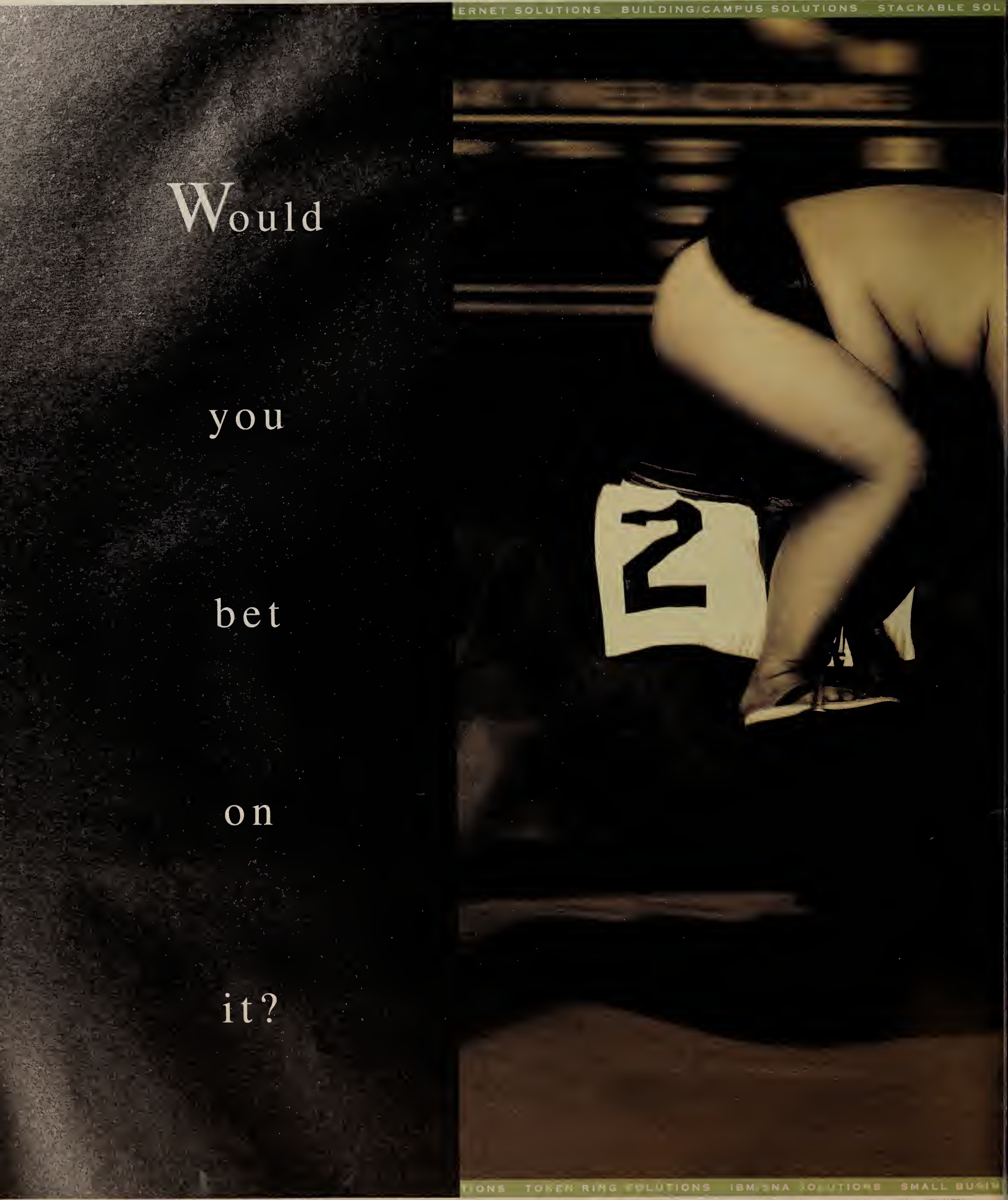
Since you need to take the server down and then bring it back up again to reclaim system resources, you need to add more memory, Nutter says.

Even after adding more memory, you will still need to take the server down and restart it about once a month to defragment the memory pools. Novell eliminated this problem in NetWare 4.X, which has a single memory pool, Nutter explains.

Although there are settings that can be used to help optimize the server, Nutter adds, none he's aware of will help reduce how often you now have to take down the server.

Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww.com.



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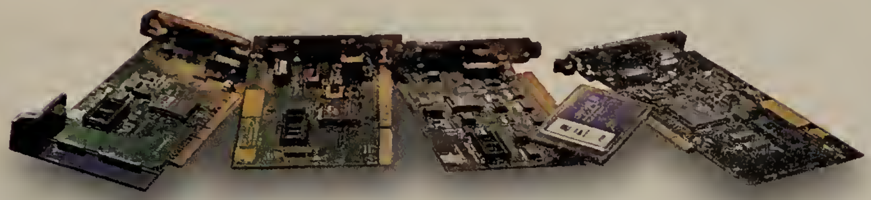

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NetWorld+Interop 96 Preview

A special guide for network decision makers

You won't mistake the fall version of NetWorld+Interop for the spring edition held in Las Vegas.

For one thing, Gigabit Ethernet has emerged as a new term, and early versions of the technology will be on display. Also new is Interop DotCom, a companion conference focused on intranets and the Internet. Then again, as at past shows, there will be large doses of ATM, network management and LAN switching hype, information and demonstrations. What follows is our take on the best sessions and places to visit to learn a little about the latest technologies and bone up on the core technologies used by your company day to day.

NETWARE EVERYWHERE

Windows NT may be getting most of the attention these days, but Novell, Inc.'s NetWare will be in the spotlight at the NetWare Conference Sept. 16-20 in Atlanta.

The conference will be held in conjunction with NetWorld+Interop 96 but run separately by NetWare Users International (NUI).

The conference will consist of tutorials and seminars presented by Novell instructors and engineers, as well as consultants and systems integrators from NUI and the Novell Authorized Education Center. Both session types will run Monday through Friday and be held at the Marriott Marquis hotel. Attendees can sign up for full-day seminars, including Integrating Windows 95 with NetWare, and the World-Wide Web and a course on NetWare 4.1 design and implementation.

In addition, NetWare users can choose from an array of 90-minute courses including a technology update on Green River, Version 4.11 of NetWare.

The latest course schedules are available via the Web at http://www.nuinet.com. To register, call (800) 755-9898.

Wednesday

September 18

Our picks

10:15 to 11:45 a.m.
Virtual LANs

Sure it's confusing trying to figure out the difference between all the virtual LAN products on the market. But it can be even more confusing trying to decide the right option for your network. Nevertheless, it can be done. This session assumes you're interested in VLANs and the administration, security and cost benefits they can offer. Helping to sort through VLAN deployment and selection issues will be John McConnell, president of McConnell Consulting, Inc., and Steve Adams, a former value-added reseller of LAN products currently consulting on the development of Fast Ethernet products.

Pick of the DAY

Keynote

EVOLUTION OR REVOLUTION? THE FUTURE OF NETWORK COMPUTING

Eric Schmidt, chief technology officer,
Sun Microsystems, Inc.

Wednesday, 9 to 10 a.m.

Java. Intranets. Few people have done more to make these the hottest new topics in networking than Sun's Eric Schmidt. He will bring listeners up to speed on how we got where we are and examine what the new world of shared resources might look like in both public and private networks. Having helped to develop Java, he also will offer an insider's view of how the Java programming platform can influence the shape of that world.

Considerations for Deploying NT Systems as Distributed Applications Servers

Open a new door for your Windows NT platform by learning how to deploy NT systems as distributed applications servers. Jason Perlow, chairman of the National Association of NT Users Groups, will lead a panel focusing on how to integrate an NT applications server into an existing corporate network.

12:15 to 1:15 p.m.
Keynote: Dr. Irving Wladawsky-Berger

Wladawsky-Berger, general manager of IBM's Internet Division, takes a look at the effect of the Internet on where applications reside, in his presentation titled "The Center of Gravity for the Internet: Server or Desktop?"

2 to 3:30 p.m.
The Future of Routing

Heavier Internet and intranet usage are putting an essential piece of the Internet — routers — under enormous pressure. Discussion particpants — Dr. Yakov Rekhter, Cisco Systems, Inc.'s Internet guru; Ramesh Govindan, a computer scientist at the University of Southern California; and Dr. Bala Rajagopalan, a researcher in internetworking at Bell Communications Research — discuss the latest routing technologies. (This session was packed last year.)

4 to 5:30 p.m.
SNA and TCP/IP Coexistence

Integrating LAN and SNA traffic is becoming a necessity for many network managers as TCP/IP networks proliferate. Users with experience doing just that discuss technologies designed to address the issue, including Data Link Switching, MPTN, TN3270E and frame relay 1409.

6 to 8 p.m.
ATM Switching Test and Evaluation Results

Experts who have gone out and kicked the tires of ATM switches present their findings to help enterprise network managers decide what to buy. Presenters include Nicholas Lippis, president of Strategic Networks Consulting, Inc., and Scott Bradner, a consultant with Harvard University's Office of Information Technology.

Thursday

September 19

Our picks

2 to 3:30 p.m.
In Perspective: Making the Internet More Secure

If the terms hacker and information hijacking make your blood pressure rise, this session may be able to help you. Security expert Jeff Schiller of the Massachusetts Institute of Technology will address current Internet security threats and technologies available to combat them.

4 to 5:30 p.m.
ATM: A Status Report Quick Hit

So far there's been a lot of talk about ATM, but little action. Find out what progress has been made with standards and whether customers feel ready to take ATM out of the lab and into daily operations. Keith McCloghrie, chairman of the ATM Forum's LAN Emulation workgroup, will lead a panel that will address these ATM switching issues and offer customer case studies.

Firewalls and the Future of Internet Security

The Internet security measures you have in place today might seem adequate, but the next big

Pick of the DAY

General Conference Session

USING ATM IN THE REAL WORLD TODAY

Boeing's Phillips

Thursday, 10:15 to 11:45 a.m.

Sure you've heard plenty about ATM standards, capabilities and test beds, but is anyone actually implementing the technology in production environments? Hear from a panel of ATM customers, including Jeffrey Phillips of Boeing Computer Services and David Dirks of Lawrence Livermore National Laboratory, who will offer advice to those contemplating the deployment of ATM. Speakers will discuss their decision process, deployment experience and long-term ATM plans.

threat could be right around the corner. This session will discuss the changing nature of these threats and ways in which firewalls and security services can keep you protected in the future.

6 to 8 p.m.
Network Industry Consolidation: Is It Good for You?
Vendors such as Cisco Systems, Inc. and 3Com Corp. have been on buying sprees, snatching up important technologies that they cannot or choose not to develop themselves. But is all this industry consolidation good for customers? Panelists will discuss whether overlap in product lines and support services leave network managers with unsupported equipment, or if consolidation will result in best-of-breed products from a small group of top players. Hear what VIPs from the internetworking industry have to say in this session.

Friday

September 20

Our picks

9 to 10 a.m.
Keynote: Roel Pieper, president and chief executive officer, Tandem Computer Corp.
In his address, titled "Convergence of the Internet and Intranet Technologies: The Impact on Businesses," Pieper will discuss how blending public and private Web technologies affects the corporate business model. He will focus on how companies can deploy a low-cost network that employees, suppliers and customers can access via the 'Net.

10:15 to 11:45 a.m.
Switching in a Routed World
With customers clamoring for more bandwidth in their routed nets, switches have become the latest and greatest way to segment the LAN for a bandwidth boost. Speakers in this session, chaired by David Passmore of Decisys, Inc., will discuss how to deploy workgroup and data center LAN switches to complement routed architectures.

The Ultimate in Wireless
Looking for the latest word on wireless? This session, led by DataComm Research, Inc.'s Ira Brodsky, will look at the Personal Communications Services (PCS) architecture with respect to data services. It will also examine PCS' impact on existing technologies such as Cellular Digital Packet Data.

2 to 3:30 p.m.
RMON 2: End-to-End Management of the Enterprise Intranet
The transition from shared to switched virtual networks often leaves net managers feeling like they're driving blind. Bring your network traffic patterns into focus by learning how to overcome the limitations of Remote Monitoring and RMON 2 in switched environments. This session teaches customers how to take full advantage of RMON 2 by deploying a net infrastructure that provides a multilayer view of the network. This approach allows net managers to use RMON 2's advanced features such as dialog management, network design and simulation, capacity planning, traffic flow/usage analysis, performance monitoring and fault tolerance.

SNA Migration to Frame Relay
The frame relay market is booming with customers using the technology to transport LAN traffic across the wide area. But in the next few years, the SNA world is expected to add to the frame relay market's rapid growth. Ease your concerns about the migration from leased-line to switched nets in this session, chaired by Cascade Communications Corp.'s Desh Deshpande. Speakers will cover what is needed to reliably transport SNA across a frame relay network and update attendees on standards and technology to help with the transition.

Pick of the DAY

General Conference Session

GIGABIT ETHERNET: THE NEXT CAMPUS BACKBONE OF CHOICE?

Friday, 10:15 to 11:45 a.m.

While Fast Ethernet and FDDI may adequately handle traffic now, customers need to plan ahead for higher speed backbone technologies to meet growing capacity needs. This panel discussion, chaired by Nortel Multimedia Networks' Tony Rybczynski, is the perfect place to get up to speed on Gigabit Ethernet. Find out about future 1G bit/sec Ethernet products, emerging standards and how successfully it will compete with ATM in the campus. Panel members will include Tony Lee, chairman of the Gigabit Ethernet Alliance, Paul Krystosek of Argonne National Labs, and Joe Skorupa of Fore Systems, Inc.

Skorupa

FRAME RELAY, SMDS GROUPS ADDRESS ATM ISSUES

When the Frame Relay Forum gathers at NetWorld+Interop, it will have more than frame relay on its mind.

Recognizing the interest users have in migrating their nets to ATM as a backbone technology that can handle voice, video and data, the forum will have as its meeting theme "How to migrate from frame relay to ATM economically and without disruption."

Morning sessions will feature presentations by industry experts, including Christine Heckart of TeleChoice, Inc., Rick Malone of Vertical Systems Group and Steve Taylor of Distributed Networking Associates. They will also participate in a panel discussion.

In the afternoon, showgoers can choose from three tracks for further information: Advanced Technology, Strategic and User Implementation.

Registration starts at 8 a.m. in 202E at the Congress Center. For more information, call (415) 578-6980.

SMDS Interest Group

Separately, the Switched Multimegabit Data Service (SMDS) Interest Group, or SIG, will also focus on how to work with ATM. The keynote address by analyst Caroline Robertson of International Data Corp. will include recent revisions to the SMDS-to-ATM interworking protocol that lets the connectionless broadband service interoperate with connection-oriented ATM.

Users Martin Keller of Northrup Grumman and Jeffrey Shapard of PSINet will describe how they use SMDS for broadband interenterprise connections to support collaboration among workgroups and business partners.

The sessions are Thursday from 1 to 3 p.m. in Room 263 West at the Congress Center.

SMDS members who cannot attend may view the program via videoconference. For more information, call (415) 578-6979.

INTRANETS AND THE 'NET

This time last year, the word "intranet" didn't even exist. Now it's the subject of a new two-day conference to teach IS professionals how to use the Internet as a business tool. Interop DotCom will be held in conjunction with NetWorld+Interop Sept. 17 and 18 at the Omni Hotel in Atlanta. The conference is broken into four tracks.

The Intranet Deployment track will teach IS managers key skills for leading their organizations' intranet efforts. Sessions in this track include Migrating Legacy Systems to an Intranet.

The Intranet Application Development track looks at technologies behind the browser, such as Java and Virtual Reality Markup Language. Sessions include Java for the Intranet and First Client/Server—Now Intranet? Attendees looking to learn more about Web client and server technologies might want to check out the Web Development Issues track. Sessions include Dynamic Page Generation Techniques and JavaScript vs. Visual Basic.

The Technology@Work session compares and contrasts vendors' intranet offerings to help attendees choose the most appropriate products for their business. This track's sessions include a course on how to select the best collaborative intranet tool.

More information about Interop DotCom is available at http://www.interop.com. To register, call (800) 488-2883.

Plug in to Network World Fusion and get the big show picture, including daily news updates, exclusive coverage and more. Check out the Complete Outsider's Inside Guide to Atlanta. From the main menu, click NetRef then NetWorld+Interop.

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http://www.nwfusion.com

EDITORIAL INSIGHTS

Senate rails against browsers

On my second cross-country trip in four days, I fell asleep reading *The Green Mile: Part 6* and dreamed I found this news clipping in my in-box.

Senate demands end to browser development

WASHINGTON, D.C. (AP, Sept. 2, 2002) — Senate Majority Leader Ray Noorda (P-Utah) today demanded that the Department of Justice order Microsoft and Netscape to cease development of new Internet browsers, saying the ever-escalating battle for Internet dominance had sapped the American economy of its vitality.

In an impassioned speech before the Perotista-controlled Senate, Noorda — once a key figure in the information technology industry — claimed American workers and shoppers are so consumed with downloading new browser versions, Netscape plug-ins and Microsoft ActiveX Controls that they no longer have time to produce anything of value or to consume products. "We have been transformed from a nation of thinkers and doers to a nation of downloaders worried about whether we are keeping up with the technological Jones'es," Noorda said.

Noorda's comments came only a day after Netscape released Version 407 of its Navigator browser, which includes the ability to listen to AM radio from any laptop. Version 407 had just completed its 37-hour beta trial, while versions 408-441 are in development. (Microsoft, which has been criticized of late for slipping behind Netscape in the browser race, vowed to deliver Version 405 of its Internet Explorer "before the next major religious holiday," though company spokesman Jim Manzi declined to specify which religion the company was referring to.)

Mark Gibbs, author of IDG Books' bestselling *Deleting Old Browsers for Dummies*, said the continuing instability in the Internet market has virtually halted development of new applications. "How can you build to a platform that only lasts 51 days?" asked Gibbs. "The only apps being developed now are crossword puzzles and 3-D, rotatable crossword applets."

According to research firm International Data Corp., the average PC user now has 62 browsers installed. That has significantly limited the usefulness of the desktop machine because each "browser/operating system/object bucket/API repository" consumes a minimum of 1G bytes of storage and requires 256M bytes of RAM to operate (somewhat less if the touchscreen option is disabled). Intel Corp. recommends the use of at least a 757-MHz Decadium processor to support current browsers.

"There is no capacity left to run any other application," said IDC Chief Executive Officer Bob Frankenberg. "Our PCs, in essence, are simply containers for browsers."

In the late 1990's, it was hoped that the browser model of accessing information would actually allow for the development of simpler, less-expensive desktop devices that would rely on applications and data housed on Internet servers. But the dream of the so-called Internet device died with the release of Internet Explorer Version 231, which cracked the 800M-byte storage requirement and supported some 250,000 ActiveX Controls.

"It's a shame, really," said former Oracle CEO Lawrence Ellison, who was a vocal proponent of the Internet device idea at the time. "We could have been freed from the Web of Microsoft control, no pun intended. But Bill outmanuevered us again," added "Big Larry" Ellison, who now runs the Used Cars 'R' Us operation on the Auto Mile in Redwood City, Calif.

In response to Noorda's call for federal intervention, the Justice Department issued an electronic press release available on its Web site (www.bookem.com). "We firmly believe the free market is the best arbiter of whether development should continue on Web browsers and servers." (This statement best viewed with Internet Explorer Version 396.)

John Gallant, editor in chief jgallant@nww.com

VENTURE OVER THE HORIZON

Access and architecture are key to resolving the bandwidth brouhaha

Kevin Fong

Technologies that increase bandwidth in the local access loop beyond today's 28.8K bit/sec analog modems are generating a lot of investment interest in the venture capital community. This isn't an issue that just involves surfing the 'Net for fun. It also concerns a company's ability to support its mobile workers, thus making them more productive.

In many cases, the 28.8K bit/sec speed of telephone modems does not allow off-site employees to tap into corporate networks for the resources they need to do their jobs. In addition, these modems have a difficult time delivering the media-rich content that is beginning to pervade the Web. There are, of course, ISDN connections that deliver data at 128K bit/sec. But with the 3-D graphics, animation, sound and video that are becoming a part of every database, even 128K bit/sec feels like drinking a very thick malted shake with a very thin straw.

While the telephone companies have made a significant commitment to ISDN, they are exploring several alternatives for offering more bandwidth. The most excitement is being generated by Asymmetric Digital Subscriber Line (ADSL), which can deliver data at 6.1M bit/sec and uses the same copper twisted-pair wiring as voice calls.

But before we get lost in acronyms like ISDN, ADSL and VDSL (a higher speed sibling of ADSL), let's look at two issues: access and architecture.

None of the business plans I've seen are dependent upon a specific access method. The bandwidth problem is not solved simply by creating a new transmission method. The major issue, along with cost-effectiveness, is how these methods fit into the existing network, and how they can be deployed. Any plan that does not flexibly accommodate different access technologies is making a huge, and unnecessary, bet on the future.

> *The major issue is how these methods fit into the existing network, and how they can be deployed. Any plan that does not flexibly accommodate different access technologies is making a huge bet on the future.*

The one exception to this is wireless access. A number of companies are looking at using available space in the gigahertz range to provide megabit-per-second bandwidth. There is some very interesting work being done with Multichannel Multipoint Distribution Services (MMDS), also known as wireless cable.

From a cost standpoint, wireless technologies offer an attractive option. Estimates I've seen suggest that it might cost as little as $40 per new subscriber to implement Local Multipoint Distribution Services (LMDS), a form of wireless cable that achieves speeds of 1.5M bit/sec. That's well below the $1,000 it costs per subscriber for ADSL. The downside of LMDS is that it is not yet equipped for two-way digital transmission, and therefore must use some other type of return channel such as ISDN. There is even some discussion that direct broadcast satellite systems like DirectTV might offer broadband data services.

Looking out over the next few years, the regional Bell operating companies' networks will be running out of capacity as they struggle to deal with the provisioning of ISDN. Long Internet data calls, whether over ISDN or V.34 modems, are sucking up central office capacity that was originally built for shorter voice calls. The more ambitious plans I've seen that address this capacity issue propose using traditional switching technologies such as ATM or frame relay to replace the potpourri of multiplexers, routers, LAN switching hubs and such with an integrated access product. These integrated access products promise new architectural options Internet service providers and telcos can use to solve their capacity problems.

Traditional telco providers are missing out on the ISP and telco market because they lack knowledge of the technologies needed to solve the capacity issue. This knowledge is the foundation for success in the entire internetworking market because these technologies will form the basis of the new central office. For these reasons, providers such as Lucent Technologies, Inc., Northern Telecom, Inc. and DSC Communications, Inc. are in danger of losing their franchises. Cisco Systems, Inc., Cascade Communications Corp., Ascend Communications, Inc. and 3Com Corp. are all well-positioned to claim this market. Many of the new start-ups whose plans I have recently seen should also be in a good position to satisfy some of this product demand.

The traditional telco providers need to realize they've missed more than the corporate internetworking market. If they are to retain their presence with the telcos, they need to follow the lead of Cisco and others in that market and acquire the necessary technology.

The bottom line is that internetworking technology will take over the current public switched telephone network infrastructure, and the telco suppliers and telcos that don't realize this soon are dead.

In the long term, some type of xDSL technology — whether ADSL or VDSL — will provide the answer to more bandwidth. I also think the right systems architecture can be designed to minimize the impact on the service providers adopting these new technologies.

Dreams of unlimited bandwidth, however, will have to wait. ADSL, MMDS and cable modems will not be an option for most of us for the next three to five years. First, there is the size, scope and cost of the phone and cable companies' upgrade to the infrastructure. On top of that, it will take time to develop the appropriate standards.

Given all of this, 128K bit/sec is as good as it is going to get for awhile. Like it or not, ISDN will be with us for a long time.

Fong is a general partner of Mayfield Fund, a venture capital firm based in Menlo Park, Calif. He can be reached via the Internet at kfong@mayfield.com.

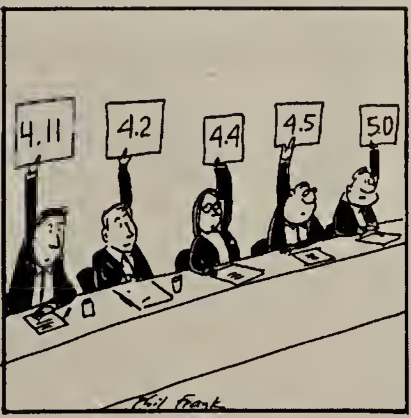
USER VIEW

Version number will determine Green River's fate

By Ben Rothke

In a few weeks, Novell will release Green River, its long-awaited revision of NetWare 4.1. The folks at Novell are counting on Green River to increase NetWare 4.X's penetration into the mainstream corporate computing arena. A lot of organizations are using NetWare 4.X, but not as many as Novell would have liked by mid-1996.

With Green River, Novell has done a great job of making NetWare Directory Services (NDS) easier to use and configure. While many companies may have been hesitant to take on the more complex NDS design, the tools in Green River will allay their fears.



But beyond all of the really cool tools and features that Green River has, the key factor that will determine its success — and perhaps that of Novell as a major player in the network operating system (NOS) market — will be its version number. Specifically, the key to Green River's success will be whether Novell releases it as NetWare 4.11 (as announced) or smartens up and opts to give it a different version number.

You may ask, what the heck does the version number matter? Whether Green River becomes NetWare 4.1a, 4.11, 4.2 or 4.5, what difference does it make? Shouldn't we concentrate solely on the fact that Green River is quicker, easier to use and configure, and has more tools than NetWare 4.1?

Green River's version number is important because it will reflect Novell's marketing strategy. The serious and successful marketing of Green River will either break Novell or take the company well into the 21st century.

Novell is basing much of its future on NetWare 4.X. NetWare 4.X's biggest direct competitor is Microsoft Windows NT. Windows NT is a fantastic NOS. But personal experience with both products has convinced me that the NDS directory model is far superior to NT's domain model.

Even given the superiority of NDS, NT has taken corporate America by storm. There probably isn't a single Fortune 100 company that hasn't seriously looked at Windows NT. In addition, many information technology (IT) shops are phasing out NetWare and replacing it with NT.

The secret to NT's success lies not in its technical merits alone, but in Microsoft's brilliant marketing and advertising strategy and the creation of many successful Microsoft solutions providers.

Novell has also spent a lot on marketing NetWare 4.X and NDS, but its efforts don't seem to have had the same impact as Microsoft's.

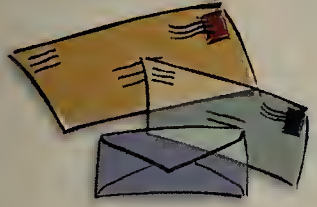
When the first slow and buggy version of Windows NT came out three years ago, it was not Version 1.0 as one would have expected — it was Version 3.1. Marketing and perception, my friends, carries a whole lot of weight. I'm not suggesting that Novell create vaporware and market it as NetWare 6.83. My point is that it takes a combination of technical prowess and effective marketing to generate profits.

That is why it is vital that Green River be released as NetWare 4.2, or better yet NetWare 4.5. Novell must convey the idea that Green River is hot, current and worth looking at. Should Novell release Green River as NetWare 4.11, the message Novell would be conveying is that Green River is a maintenance upgrade and not really that important to your network infrastructure.

Microsoft clearly knows the power of mixing marketing with technology. Novell does not have such a clear picture. It is not over for Novell; the ball is definitely still in its court. What it needs to do now is try to score some points and not throw the ball out-of-bounds.

Rothke is a New York-based network engineer and security administrator for a major financial organization. He can be reached on the Internet at 74710.3325@compuserve.com.

MESSAGE



QUEUE

Technically speaking

I'd like to correct two statements in Charles Bruno's feature on high-tech votechs (July 1, page 1).

First, the article talks about a student at Francis Tuttle Area Vocational Technical School who "routinely worked with NetWare while maintaining the campus network." The article then states that "upon entering the school, students are assigned to the MIS department for hands-on training."

Neither of these statements is true. In fact, students are allowed only minimal access to network resources and no access to noninstructional areas.

No student has ever been given any supervisory or administrative power on any production network, although students do work at every level using test networks in computer labs.

Al Smith
MIS director
Francis Tuttle
Oklahoma City

Bruno responds: In my interview with Carol Snider Farris, director of Francis Tuttle's Computer and Business Center, she said some students indeed have been assigned to the MIS department. Likewise, the former student interviewed said he had production experience that complemented his network lab exposure. If that is not the case, we regret the confusion.

The real problem

Regarding your editorial "Will Unix wake up?" (July 15, page 40): There has been a lot of sound and fury about Unix vs NT.

However, one piece of information needs far more attention than it has yet received: Windows NT as a server hits input/output bottlenecks long before it hits processor bottlenecks in a symmetric multiprocessing configuration.

Users need to benchmark applications under conditions of full load before making a final commitment to a platform. Interested readers can obtain a copy of my company's benchmarks by sending E-mail to me at 71702.1620@compuserve.com.

Jonathan Handler
Chicago

By any name

Your editorial "When is a VPN not a VPN?" (July 29, page 40) quoted Newton's Telecom Dictionary's definition of a Virtual Private Network (VPN) as "a carrier-provided service in which the public switched network provides capabilities similar to those of private lines."

That is exactly what Digital Equipment Corp.'s AltaVista Tunnel does, and we are calling it a VPN. It uses a carrier-provided service (Internet service) and provides capabilities similar to those of private lines (it uses the Internet to replace private leased lines).

When a new technology comes to market, vendors need to explain it to the press, analysts and customers in a way that builds on knowledge they already have. If you have a better term for the technology, I'm sure vendors are willing to listen.

Bill Gassman
Internet engineering staff member
Digital
Nashua, N.H.

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Solving the clustering conundrum

A guide to choosing the server clustering system that's best for you.

ILLUSTRATION BY THOM WILLIAMSON

By David Strom

Server clustering is shaping up as a new weapon that vendors of Windows NT systems are using in their battle to win market share from Unix vendors, and to convince you that NT is ready to run your mission-critical applications.

What the NT vendors aren't telling you is that the number of applications that can take advantage of clustering is limited and that the Unix folks, who have been at this game a lot longer, pretty much have cornered the market for IP-based applications such as Web servers.

That said, there are certain applications where NT clusters will serve you well — database servers, for example. And things are bound to get better going forward, so it would behoove you to understand what to look for in a clustering system and how the various implementations differ.

At its core, server clustering is a simple idea: Take several servers and tie them together using a variety of hardware and software tricks to ensure either high availability or scalable performance. Ideally, the goal is to have both: a collection of hardware that doesn't fail and doesn't run out of gas as applications grow and consume more processing horsepower.

However, for such a simple notion, there are many subtle differences among the various implementations, which could have drastic consequences for corporate network architects and application builders.

First, let's be clear that clustering is different from symmetric multiprocessing (SMP), whereby more than one CPU resides inside a single server. With SMP, the operating system is aware of the multiple processors and divides its own tasks among the various CPUs. The multiple CPUs share memory, disk and other machine resources. However, when one of these shared resources fail, the entire machine stops working.

Jerry Sheridan, director of client/server computing for Dataquest, likes Tandem's chances. "Tandem is in a pretty good position, especially if it can port ServerNet to the Intel platform," he says. "NT is taking more and more market share in the mid-range area," notes Sheridan, who thinks the emergence of strong NT clustering products will help grow the clustering market for both Unix and NT vendors.

That limitation is overcome when SMP hardware is combined with clustering systems, providing the ultimate in high-reliability and scalable machines.

Clustering solutions have long been available in the minicomputer, mainframe and Unix worlds. IBM, Digital Equipment Corp., NCR Corp. and Tandem Computers, Inc. have been selling clustered servers for over a decade. Within the past year, these four vendors, as well as Intel Corp. and Compaq Computer Corp., have also started selling PC clusters, primarily on Windows NT servers. Hewlett-Packard Co. is soon to follow. And Microsoft, trying to beef up NT clustering, has announced an effort to standardize and port the best of the Unix world to NT under the code name Wolfpack (see story, page 44.)

Finding the right mix

Analysts generally agree there are only two basic clustering models. The difference between them is whether multiple copies of the same application have the ability to access the same file.

If they do, it is called shared disk or symmetric data access, and special software called a distributed lock manager has to mediate access among the various applications.

If they don't, it is called shared nothing or partitioned data access, and each server in the cluster owns a portion of the overall disk resources. Most of the NT clustering solutions support shared nothing, whereas most Unix alternatives can be configured to support both models.

Within these models, however, a great deal of variation exists in several areas: the number of servers that can be connected; the nature of the connection; the protocols, client machines and applications supported; whether any software is required on each network client; how the cluster is managed; and whether you can vary different processor hardware inside one cluster.

Perhaps the most important issue is the mix of applications, client operating systems and protocols the clustering system supports. Each vendor offers a different combination, depending on whether you choose its NT or Unix system. It pays to read the fine print to determine whether what is supported will match your application needs.

The best use of clustering involves database applications: Here is where you'll get improved availability of the server as well as the scalable performance gained by adding extra hardware. However, the clustering hardware must support your particular database server, along with the specific clients and protocols used to access that server. That could be a tough situation.

For example, with Digital's first

Wolfpack: Will this dog hunt?

Microsoft Corp. last year announced an initiative, along with several server vendors, to bring standard APIs to Windows NT clustering, including a minimal level of clustering-type features such as failover and failback.

Called Wolfpack, the first version of this software will ship sometime next year. It will add value to NT Server Version 4, such as the ability for software developers to write high-availability applications. The APIs will also enable all Microsoft Back-Office applications to make use of clustered servers.

Hewlett-Packard Co., Intel Corp., NCR Corp. and Tandem Computer, Inc. were among the original backers of Wolfpack, but most vendors of NT hardware are likely to support it.

Initially, Wolfpack will only support two-server clusters, but it will be available to third-party implementors for all four NT processor types: Intel, Alpha, MIPS and PowerPC.

Mark Wood, a product manager at Microsoft, says an "open interconnect model" will accompany the APIs. "You'll be able to specify the kind of attachment between the two servers," he says.

However, analyst reaction to Wolfpack has so far been lukewarm, if not downright cold. "Wolfpack APIs are pretty limp — Microsoft has to be careful that these APIs don't favor any particular vendor," says Brad Day, an analyst with Giga Information Group. "Besides, Wolfpack is providing very basic failover, something that Digital had 10 years ago."

"Wolfpack will be a commodity," says Jerry Sheridan, director of client/server computing for Dataquest, Inc. "Vendors will have to come up with enhancements to support or services to distinguish themselves from what Microsoft is offering."

— David Strom

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release of NT clustering, which began shipping earlier this summer, only applications that make use of Named Pipe and Server Message Block protocols will work.

This means all IP-related applications such as Web servers aren't supported on Digital's NT clusters, although they will work on its Unix counterparts. And though Digital's NT cluster does support non-Windows clients, they have to manually reconnect to the server after a failure.

Compaq's On-Line Recovery Server, which has been shipping since last year, supports two applications — Oracle7.3 and SQL Server 6.5 — and only on Windows clients. It won't support Macintosh or OS/2 clients at all, and non-NT clients have to manually reconnect.

NCR's LifeKeeper, shipping since January, seems to have the widest support for all types of clients and applications; the product supports automatic reconnection of any NT client, for example.

"We have a richer set of features and functions, and can work with a wider array of software. While Compaq only runs with the latest versions of Oracle and SQL server, we can run with older versions," says Martin Sinnott, director of Windows NT product marketing for NCR.

Server sweet spot

Beyond the right mix of applications, the next critical item is how many individual servers are supported by the cluster. Keep in mind, each server can have more than one processor, enabling you to build ever more powerful servers. Most of the NT-based clusters today support two servers, whereas the Unix versions are more capable.

"For people worried about high availability, the sweet spot is three servers," says Eric Schott, a product manager for Unix clusters at Digital. Schott feels having two servers still allows for a small chance that two independent failures can bring down a cluster, such as a bad disk drive in one server and a broken power supply in a second. "Having the third server in the cluster is insurance against these independent failures," he says.

Stratus Computer, Inc.'s Radio Clusters fits that bill. Radio Clusters, which started shipping last month, comes with support for six servers and is expandable to 24. It uses Pentiums running NT.

Compaq and others have plans to support as many as four servers in future versions, while vendors including NCR plan to go beyond two servers in their NT clustering products later this year.

The Unix market is equally diverse. Digital's Unix products support a maximum of eight servers; HP's Unix solutions support four.

Late last month, Groupe Bull began selling clusters of eight servers in its Sagister line, and Tandem's ServerNet already supports hundreds of nodes.

Tying it all together

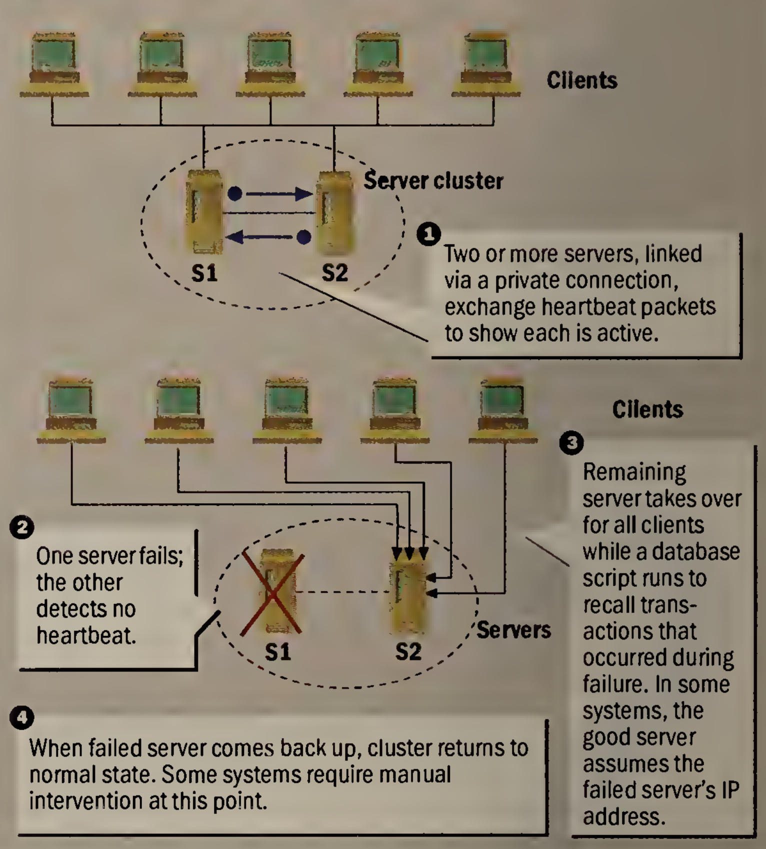
Another major difference involves how the clustered machines interconnect. Each vendor has a mixture of cables, network cards and other gear. Some components are proprietary, such as Tandem's and Compaq's, whereas others use fiber or Fast Ethernet network cards that are available from many vendors.

Generally, you have three kinds of interconnection, says Mark Wood, a product manager at Microsoft: The ordinary network connection to the server, a shared SCSI bus that connects just the disk drives to multiple servers, or a dedicated, private link among the servers that is used in addition to the network connection. "The last method is the best for high-availability applications, but it can also be the most costly," Wood says.

Both Digital's NT and Compaq's clustering solutions use the second method, connecting two machines to a common set of SCSI disks via separate SCSI cables. Compaq uses its own products for the disk drives and connectors. "This means Compaq customers are locked into Compaq storage and cannot shop around for their disk drives. With Digital, you can choose the disks you want to buy," says Jane Wright, an analyst for DataPro Information Services Group. NCR's LifeKeeper can be configured to use either SCSI or a dedicated connection.

Digital uses a 100M bit/sec Memory Channel connection between machines in its Unix clusters. Although it's proprietary, it uses standard components and network connections. Tandem uses a 100M byte/sec — yes, that's megabyte, not megabit — connection for its Server-

BASIC CLUSTERING FAILOVER PROCESS



❶ Two or more servers, linked via a private connection, exchange heartbeat packets to show each is active.

❷ One server fails; the other detects no heartbeat.

❸ Remaining server takes over for all clients while a database script runs to recall transactions that occurred during failure. In some systems, the good server assumes the failed server's IP address.

❹ When failed server comes back up, cluster returns to normal state. Some systems require manual intervention at this point.

The clustering picture: Profiles of key vendors

Vendor	Product name	Number of Unix nodes supported/ CPU types	Number of NT nodes supported/CPU types	Applications supported	Pros	Cons
Compaq	On-Line Recovery Server	Not available	2/Intel	Oracle 7.3 and SQL Server 6.5	Planned support for Tandem's ServerNet under NT	Limited functionality for failovers and poor choice of supported clients
Digital	TruCluster (Unix), NT Cluster	8/Alpha	2 /Alpha, Intel	Oracle Parallel Server, IBI Focus, others	Attractive price for NT clustering option	Requires its own client software for NT clusters
Hewlett-Packard	MC/ServiceGuard	4/HP	2/Intel	Oracle Parallel Server	Planned support for ServiceGuard for NT clusters	NT version not yet shipping
IBM	Scalable Power-parallel System (AIX), PC Server High Availability Solution (Intel)	22/AIX on PowerPC	2/Intel	Numerous OS/2, NetWare and NT applications	DB/2 and Notes support promised for future versions	NT version not yet shipping
NCR	LifeKeeper	8/Intel	2/Intel	SQL Server, Oracle, Notes, others	Greatest support for clients, applications, protocols	Can get pricey for supporting many different applications
Stratus Computer	RADIO Cluster (Intel)	Not available	24/Intel	Microsoft Exchange, IIS and SQL Server	Scalable up to 24 nodes	Limited application support
Tandem	ServerNet	Hundreds/Tandem Himalaya	Not yet available on NT, working with Compaq	All Tandem applications	Greatest number of servers supported under Unix	Proprietary interconnect hardware

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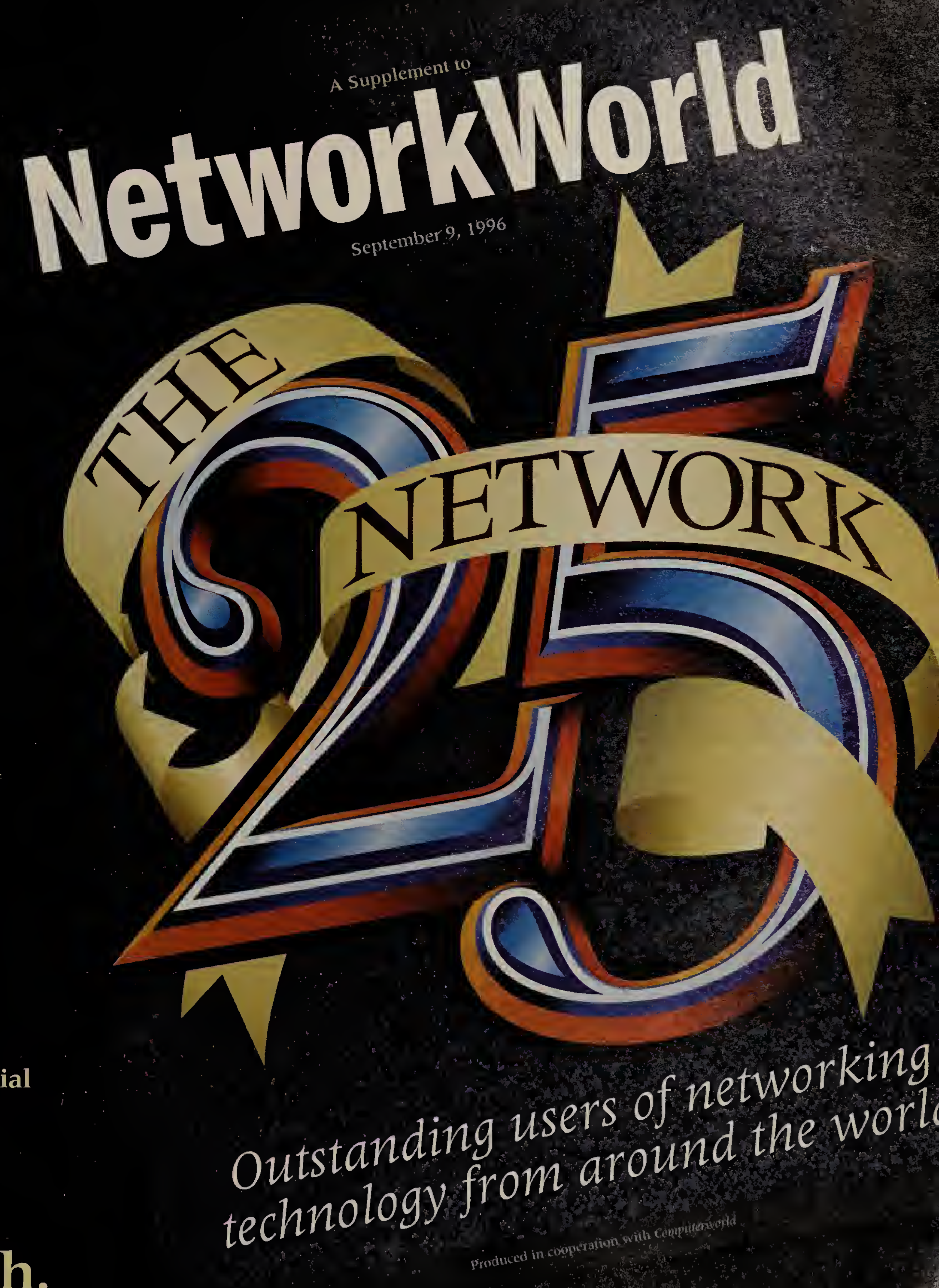

A Supplement to
NetworkWorld
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Net links, based on its own equipment.

Checklist items

Apart from interconnect hardware, you also need to consider whether additional software is required on the client end to support the cluster. At present, that's an easy task — only Digital's NT Cluster requires such software.

"This allows the servers to switch during failover," says Bob Guilbert, NT clustering marketing manager for Digital. It also provides for a single view of the cluster's resources from the client, which can be a boon for applications written to take advantage of this method — but few presently are. Another critical difference is whether all the servers in the cluster have to be the same. This is important in situations where you want to add new versions of hardware to older clusters without having to upgrade every server. Digital offers the most flexibility, providing support for similar machines as long as they use the same brand of CPU. That means you can't mix Alpha and Intel versions of NT in the same cluster, but you can have servers using a mix of Intel chips — Pentiums and 486s, for example.

Next you should look at how the cluster handles server failures: How quickly does a switch from a failed server to a working server (called a failover) occur, and what happens when the primary server is repaired and brought back online (called failback)? Much depends on the cluster manager software, how it is set up, how often it detects whether each server is still alive, and so forth. Some of these parameters are configurable by the user, such as the time between each heartbeat, a series of packets sent out by each server to indicate it is still working.

Failbacks should happen without too much effort — otherwise, the entire high-availability notion of a cluster isn't worth much. Some products, such as the Digital and NCR NT clusters, can be restarted automatically, but this isn't the case with the Compaq products.

DataPro analyst **Jane Wright** says NCR's LifeKeeper has more features and functions than current NT products from Compaq or Digital. In particular, she notes a flaw with Compaq's failback feature: "It is ironic that when it is time to bring a failed Compaq server back up, *both* servers must be brought down simultaneously in order to restore the On-Line Recovery Server configuration."

Note that some vendors switch the server name or IP address from the failed to working servers. That can pose a problem if any of your applications expect a particular server name to be married to a specific media access control address.

Given all this activity, it's clear that NT clustering products are going to improve over the next few years, possibly coming close to the features and capabilities of their Unix cousins. However, clustering will still have limited appeal for enterprise networks. The number of applications, protocols and clients supported is still a small subset of that used in most organizations, making it a fairly narrow and expensive niche for the immediate future.

At present, your best bet is NCR's NT solution, with its wide support for clients and applications. And Unix is still the better choice if you need a Web server cluster or support for other IP applications.

Strom runs his own consulting firm in Port Washington, N.Y., and has written hundreds of articles on computer networking. He can be reached at david@strom.com.

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A NEW ROUTE FOR FAXES

Network World TEST ALLIANCE

Brooktrout's IP/FaxRouter lets you send faxes across the Internet instead of the public phone net.

By Steve Kalman

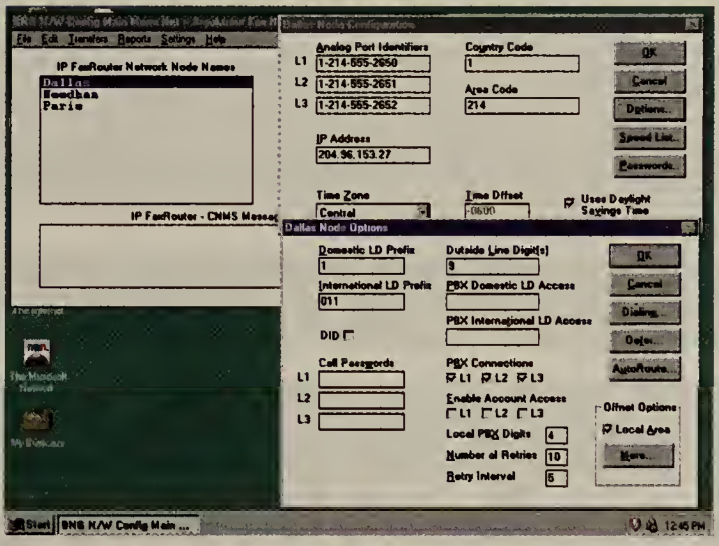
Faxing, especially international faxing, is remarkably reliable compared to, for example, sending data files via modem. But it can also be expensive, thanks to the high rates on the public telephone network. By sending faxes as files across the Internet, Brooktrout Technology, Inc.'s IP/FaxRouter can reduce costs dramatically for geographically spread-out organizations while retaining as much reliability as the Internet itself provides.

The IP/FaxRouter assumes you already have an IP or Internet connection. The device doesn't include any capability for dialing out to the Internet. What it does is convert faxes into files and sends them across the existing network to a sister device, where they're converted back and routed appropriately.

We found the product to be remarkably robust yet simple. There isn't even an on/off switch to worry about — you just plug it in. The ability to manage any unit worldwide from any machine with an Internet connection means the product can be installed in remote branches without the need for local technical support. If someone can plug in phone lines, a fax machine and an Ethernet cable, they're all set.

To send a fax from a fax machine, you dial two series of numbers. The first is the telephone number (or extension) of the IP/FaxRouter. The de-vice sounds a dial tone when contacted. You respond with a destination phone number. Faxing using a fax server as a destination printer works the same way; you just have to be sure to add the appropriate pause to destination phone books.

The IP/FaxRouter runs in two modes, off-net and on-net. In the former case, faxes can be forwarded via the Internet to an IP/FaxRouter near the destination, where it will be faxed out using the local phone company lines. In on-net mode, fax machines are connected directly to IP/FaxRouters. In that case, no telephone lines are needed, as the fax never crosses the public switched telephone network. IP/FaxRouter instead intercepts a telephone number and translates it into the IP address of another IP/FaxRouter elsewhere on the WAN.



IP FaxRouter Network Node Names
Dallas
Needham
Paris

Analog Port Identifiers
L1 1-214-555-2650
L2 1-214-555-2651
L3 1-214-555-2652
Country Code: 1
Area Code: 214
IP Address: 204.96.153.27
Time Zone: Central
Time Offset: -0600
☑ Uses Daylight Savings Time

Domestic LD Prefix: 1
Outside Line Digit(s): 9
International LD Prefix: 011
PBX Domestic LD Access:
PBX International LD Access:
DID ☐
Call Passwords: L1 L2 L3
PBX Connections: ☑ L1 ☑ L2 ☑ L3
Enable Account Access: ☐ L1 ☐ L2 ☐ L3
Local PBX Digits: 4
Number of Retries: 10
Retry Interval: 5
Offnet Options: ☑ Local Area

The IP/FaxRouter's *administration application lets you configure all IP/FaxRouters on the network with phone numbers, IP addresses and security information.*

Each IP/FaxRouter connects to any combination of a fax machine and one to three phone lines. Each unit has a built-in hard drive where incoming faxes are stored until they are complete. At that time, the fax is transferred from one unit to another over the Internet as a file. Because it's moving as a file, the fax gets all of the error-correcting benefits of the TCP/IP protocol. When the fax is completely transferred, the destination unit delivers it either to the attached fax machine or via one of the outgoing analog lines to some other destination.

Configuring the IP/FaxRouter requires a permanent IP address. Each unit comes with a serial cable that connects the management port on the IP/FaxRouter to any Windows-based PC. Using the vendor's $1,995 Configuration Network Management System (CNMS) software, you can key in the IP address and subnet mask, plus a media access control-layer network interface card address. Other functions, such as setting local time and Ethernet frame type (Ethernet II is the default, 802.3 is available) are available as well. Settings are stored in the unit's nonvolatile memory. After the unit is configured, you attach it to the Internet via a 10Base-T cable.

A company's entire IP/FaxRouter network can be managed by any PC with access to the Internet (even dial-up access) and a copy of CNMS. The CNMS software maintains a small local database with the name, phone numbers, IP addresses, time zone, offset and other configuration information of all FaxRouters.

It also contains the tables that the IP/FaxRouter uses to decide which unit should handle a particular fax. Once configuration is complete, an item on the Transfers menu, "Download all Configurations," sends the new configuration information to each IP/FaxRouter for storage on its hard disk.

IP/FaxRouter has a number of productivity and security features. You can specify delayed sending to take advantage of lower overnight phone rates on calls that must dial out to a fax machine to complete delivery. The units can even be programmed to select the destination based on time of day.

The IP/FaxRouter can handle broadcast faxing as well. A list of destination numbers can be sent along with the fax. Because the fax is stored on the IP/FaxRouter's hard disk, it can be sent to each destination without having the originator involved in each delivery. In addition, the software is smart enough to send it to each destination unit only once, letting that unit store the file for transmission to each recipient's fax machine. To make it even easier, distribution lists can be saved as speed-dial numbers.

NetResults

Product	**Brooktrout IP/FaxRouter**
Vendor	Brooktrout Technology, Inc. (617) 449-4100 www.brooktrout.com
Price	$5,995 CNMS software $1,995 ADMS software $1,995
Pros	▲ Fast, easy setup ▲ Less expensive than standard fax toll charges ▲ Remote management from any PC connected to the Internet
Cons	▼ Hardware is expensive ▼ Interface with LAN-based fax servers is not smooth

SCORECARD

Overall score	**7.9**
Management (35%)	8
Interoperability (25%)	6
Features (20%)	9
Installation (10%)	9
Documentation (10%)	9

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.

For a discussion of alternative products for faxing over the Internet, link to Network World Fusion. Select NetRef, Buyer's Guides & Reviews, then Brooktrout IP/FaxRouter.

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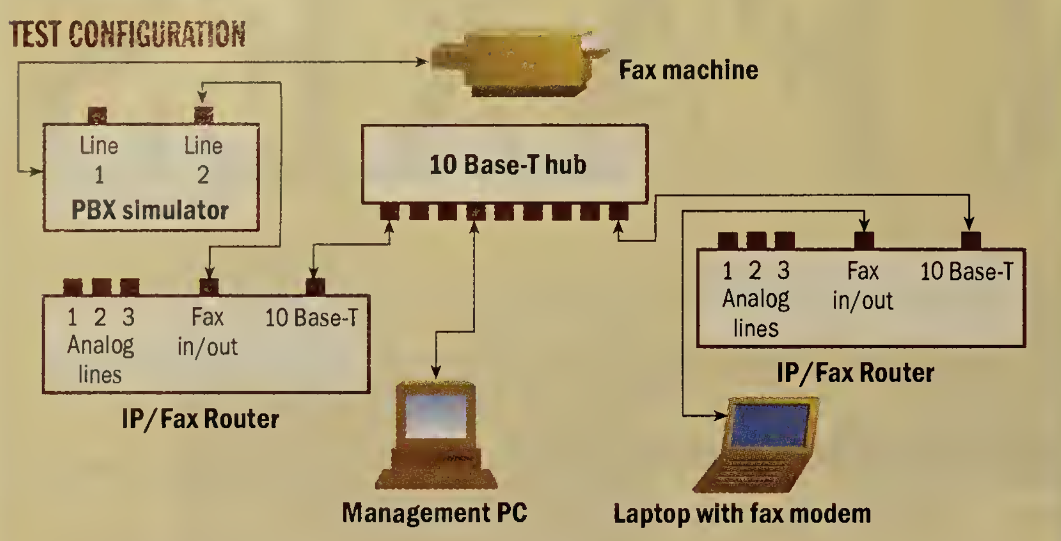
HOW WE DID IT

We tested two Brooktrout IP/FaxRouters over an Ethernet hub simulating a wide-area IP LAN.

On one end of our test network, we had a traditional fax machine hooked up to a two-line PBX simulator, allowing us to pick up the handset on the fax machine and get a dial tone. At the other end was a networked PC with a fax modem running Symantec Corp.'s Delrina WinFax Pro. Between each endpoint and the network sat an IP/FaxRouter. An Ethernet hub simulated the Internet.

We sent and received faxes from both endpoints and used bundled utilities to test management functions from a networked Dell 486/66 – a 16M-byte workhorse running Windows 95.



Organizations that need to bill separate accounts, departments or clients can assign account codes. Brooktrout's $1,995 Account Data Management Software module gives you full reports broken down by account, showing the length of the fax and the sent and delivered times.

Security is imperative

Because anyone who knows the incoming line to a local IP/FaxRouter could use the system to send faxes anywhere in the world, the system includes two levels of security. The router requires a passcode on incoming faxes — extra digits unique to each user that get appended to the destination phone number. The passcodes are validated against tables set up via the CNMS software and are stored on each unit's hard disk.

Those that need more customized security can incorporate account codes into their security scheme for a second level of security. It is possible to limit off-net destinations by account code, which lets anyone send faxes to any of your offices from an off-net location, but prohibits them from using the destination IP/FaxRouter to make an off-net delivery.

Although branch offices can merely connect their fax machines to the IP/FaxRouter, larger central offices need not change their fax-server habits. An administrator will have to make some configuration changes to tell the fax server to send some faxes to the IP/FaxRouter via the PBX as if the fax server was a normal fax machine. Which faxes go where depends on the coverage areas of the company's IP/FaxRouters.

All in all, we found the Brooktrout IP/FaxRouter to be an innovative, cost-effective product for any company faced with high fax bills.

The alliance is a co-operative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 41.

Kalman is a prolific writer and lecturer, specializing in computer telephony integration and associated products. He can be reached at skalman@prolog.net or at 76702.3564@compuserve.com.

NETWORKING CAREERS

Make The Switch

The message in the industry is clear. Soft-Switch is the one to watch, the one to work for and the one to which all other messaging companies aspire. Not only do we have the backing of Lotus and IBM, but we have the original technology and future-focused vision to compel individuals from a wide range of industries to make a dynamic switch and join the Soft-Switch team.

As messaging continues to become a mission-critical service for corporate communication, the force of our talent is making an impact on the way the world conducts business. In turn, we provide our diverse and flexible talent force with a world of opportunity for unprecedented professional development, technological challenge and creative impact. Make the switch today!

Immediate opportunities are available for individuals who possess a B.S/M.S. in Computer Science, Engineering or related field, and experience in electronic messaging systems. Your background would include expertise in several of the areas listed to the right:

Sr. Software Engineers
5+ years' experience developing within a UNIX, Windows or NT environment utilizing the C and C++ programming languages is necessary to research, design, develop and maintain new, modified and enhanced products. **Job Code-ENG**

Application Quality Engineers
Sr. level – At least 5 years' technical work experience required.
Entry level – Knowledge of testing and QA methods required; experience with e-mail systems and communications networks a plus.
Job Code-QE

Sr. Sales Managers
You will be responsible for the Wisconsin, Nebraska, North Dakota, South Dakota, Minnesota, Iowa, Missouri, and Southern Illinois territories, selling the balanced suite of Soft-Switch products and services. 5 years' demonstrated sales experience, including messaging industry experience, and experience with X.400, SMTP, internet communications, X.500, directories, gateway, switching products, LAN and WAN protocols and standards are required. **Job Code-SALES**

Project Managers
You will provide on-site and off-site post-sales consulting to customers, focusing on the planning, design and implementation of an LMS or Central-based enterprise network. B.S. in Computer Science/Information Systems or equivalent knowledge; 3-5 years' relevant technical experience in the communications and/or messaging fields; good understanding of data communications concepts; and broad knowledge of various networking architectures such as SNA and TCP/IP are required. Previous consulting and programming experience a plus. **Job Code-MSG**

Installation Specialists
Ability to install, implement, and problem-solve in an multi-vendor networking environment is essential. **Job Code-INS**

Education Specialists
At least 2 years' experience teaching or presenting to groups of customers and other employees required. **Job Code-EDU**

Technical Support Analysts
Qualified candidate will provide experience in providing training, troubleshooting, and support to customer or end user staff, as well as performing various information system functions in a technical environment. Thorough knowledge of IBM MVS and VM, and experience with JCL and JES or RSCS, Exec2, Rexx are required. **Job Code-HOT**

Located in a desirable suburban setting, Soft-Switch combines a comfortable and casual small-company environment with the rich resources, and comprehensive benefits you'd expect from a division of Lotus and IBM. Qualified candidates are encouraged to send resume, indicating job code of interest, to: **Lotus, Human Resources Department-NW, 640 Lee Road, Wayne, PA 19087; FAX: (610) 251-3548; email: rmoore@softsw.ssw.com**

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ENGINEERING & SALES OPPORTUNITIES:

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- ACCOUNT EXECUTIVES
- SYSTEMS ENGINEERING MANAGERS
- SYSTEMS ENGINEERS
- CHANNEL MARKETING REPS
- MANAGER TELEBUSINESS
- SOFTWARE ENGINEERS
- SOFTWARE TEST ENGINEERS
- HARDWARE ENGINEERS
- HARDWARE DIAGNOSTIC ENGINEERS
- TECHNICAL SUPPORT ENGINEERS
- INSIDE SALES ENGINEERS

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To apply, please send your resume indicating position of interest, to: Cisco Systems, Inc., Human Resources/Network World, 7025 Kit Creek Road, P.O. Box 14987, Research Triangle Park, NC 07709. FAX (800) 818-9202 (please use white paper with 12 point plain black font). E-mail: jobs@cisco.com (ASCII only). EOE. All trademarks belong to their respective companies.

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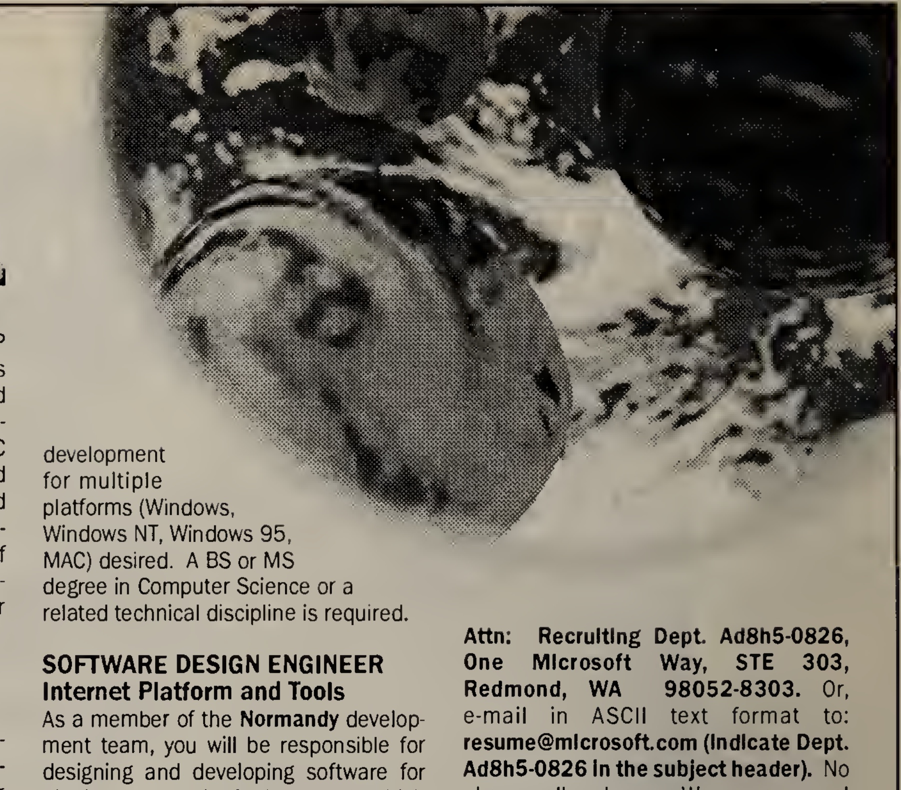

Enough business as usual. The old ways of communicating are quickly giving way to some very exciting new ones. You can make it happen at Microsoft by developing easier ways for people to share information and get things done. Opportunities now exist in our **Windows NT, Exchange, Microsoft News Network, and Internet Platform and Tools Group** for a variety of positions:

PROGRAM MANAGER
Internet Platform and Tools Group
As a member of the **Internet Services Business Unit**, your primary responsibilities will include designing protocols and software for multicast HTTP on the Internet. Qualifications should include a minimum of 3 years of experience as a project leader in an Internet environment. Experience with protocol design, HTTP, DNS, RTP/RTCP, Windows, Windows NT, and Internet client and server applications preferred. Detailed knowledge of TCP/IP and Windows architecture required. Familiarity with the IETF and demonstrated ability to supervise staff and meet deadlines preferred. A BS or MS degree in Computer Science or related technical discipline preferred.

NETWORK ENGINEER
The Microsoft Network
As a member of the **MSN** Operations team, you will be responsible for diagnosing network routing, authentication and name resolution problems for Microsoft Network (MSN) customers; configuring routers and network management systems in a global, multi-protocol network; insuring real time monitoring and alarm capability for network devices; providing periodic 7x24 on-call support; and assisting in the evaluation and lab testing of new equipment, protocols, tools and network services. A minimum of 5 years' experience in Data/Telecommunications industry in a network operations role. Must be skilled at using packet sniffers and an expert at router configuration and protocols. Familiarity with async modems, and a detailed knowledge of the Internet and its protocols and operation required. A BS degree in Computer Science or Electrical Engineering preferred.

SOFTWARE DESIGN ENGINEER
Desktop and Business Systems
As a member of the **Windows NT** development team, you will be responsible for enhancing various components which are part of the TCP/IP suite of protocols. This includes working on the TCP/IP stack itself and applications such as Telnet, FTP, IPR/LPD, DNS, RSH, and REXEC. A minimum of 2 years demonstrated programming experience in C and a strong familiarity with TCP/IP and related protocols a must. Demonstrated ability and interest in developing systems level software and knowledge of operating systems principles is essential. A BS or MS degree in Computer Science required.

SOFTWARE DESIGN ENGINEER
Desktop and Business Systems
As a member of the **Exchange** development team, your responsibilities will include working on the message transfer and storage for the Exchange Server. This includes working with key people owning other components of Exchange (client, server and MAPI layer) to track problems and do performance optimizations for client/server interactions. Demonstrated experience in client/server design and implementation, as well as strong Windows application design and development experience required. Multithreaded and client/server programming experience with OLE and Win32 APIs preferred. Skills in programming methodologies involving code core development for multiple platforms (Windows, Windows NT, Windows 95, MAC) desired. A BS or MS degree in Computer Science or a related technical discipline is required.

SOFTWARE DESIGN ENGINEER
Internet Platform and Tools
As a member of the **Normandy** development team, you will be responsible for designing and developing software for distributed security for Normandy which includes the areas of remote authentication, distributed access control, encryption, electronic billing and large scale private/public key infrastructure design. A strong networking and distributed security background with preferably NT programming experience. A BS or MS degree in Computer Science or related technical discipline preferred.

Think you've got what it takes to work for the world's most progressive, most dynamic software company. Mail your resume to: **MICROSOFT CORPORATION, Attn: Recruiting Dept. Ad8h5-0826, One Microsoft Way, STE 303, Redmond, WA 98052-8303.** Or, e-mail in ASCII text format to: **resume@microsoft.com (Indicate Dept. Ad8h5-0826 in the subject header).** No phone calls, please. We are an equal opportunity employer and support workforce diversity.

Microsoft Recruiting will be present at Networld + Interop 96. If you're interested in talking with a recruiter at the conference, forward your resume to wwwjob@microsoft.com For more information, see our http://www.microsoft.com/jobs/.

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Everyone talks about the future of networking, the next step, the cutting edge. But only FORE Systems is already there. With our impressive portfolio of top performing products and the largest installed base of ATM LAN solutions worldwide, we are clearly the dominant player in the ATM marketplace. Our plans for the future will help us build on this leadership position to reach new levels of success, creating outstanding opportunities...and a great future...for the talented people who join us. Multiple positions exist for professionals with experience in one or more of the following areas at our development sites in Pittsburgh, PA, Boxborough, MA, Bethesda, MD, San Jose, CA, and Ottawa, ON.

HARDWARE ENGINEERING
(Pittsburgh, Boxborough & San Jose)
- Design of Hot Swappable Boards, Power Supplies & MTBF Calculations
- Development Management
- Digital/Analog Design & Test
- Familiarity with FPGA/Gate-Array Design
- Embedded CPU Design Engineers
- ASIC Development & Verification (VHDL)
- LAN/WAN Product Development
- ATM Interface Design Engineers
- Hardware Validation & Test Engineers

SOFTWARE ENGINEERING (All locations)
- Development Management
- ATM Signaling Development
- ATM Routing Protocols
- UNIX Device Driver Software and/or Kernel Development
- Network Protocol Development
- LAN/WAN Product Development
- Network Management Software (e.g. SNMP)
- Software Testing Configuration Management and/or Quality Control
- Switch/Adapter Card Software and Performance Profile Testing
- Windows NT and/or Novell NetWare Device Driver Software
- AppleTalk Design Engineers
- Embedded Systems Design Engineers
- Interoperability Lab Manager

MANUFACTURING (Pittsburgh)
- Manufacturing Test Engineers
- Production Control Planners
- New Product Introduction Program Managers
- Materials/Planning & Control
- Subcontract Manufacturing Planners & Program Managers
- Manager - Traffic, Stores & Warehouse
- Manager - Customer Service & Logistics
- Senior Buyers - Mechanical & Electrical Components
- Product Managers

SALES, MARKETING & TECHNICAL SUPPORT
- Technical Trainers (All locations)
- Technical Support Engineers (San Jose & Pittsburgh)
- System Engineers (All locations)
- Account Managers (All locations)
- Product Managers (San Jose, Boxborough & Pittsburgh)
- Director, Software Engineering Marketing (Pittsburgh or San Jose)

Besides our energetic and innovative corporate culture, we offer an impressive compensation and benefits package which includes a generous stock purchase program, 401(k) plan, flex-time, tuition reimbursement and much more. Forward resume indicating area of interest to FORE Systems, HR Dept./NWSH, to your preferred geographic location:

- **Pittsburgh, PA, Bethesda, MD or Ottawa, ON- Research Park, 5800 Corporate Dr., Pittsburgh, PA 15237, FAX (412) 635-3400. Email: resumes@fore.com**
- **San Jose, CA - 2115 O'Nel Drive, San Jose, CA 95131. FAX: (408) 441-9657. Email: resumes@fore.com**
- **Boxborough, MA - 85 Swanson Rd., Boxborough, MA 01719. FAX (508) 264-4433. Email: resumema@fore.com**

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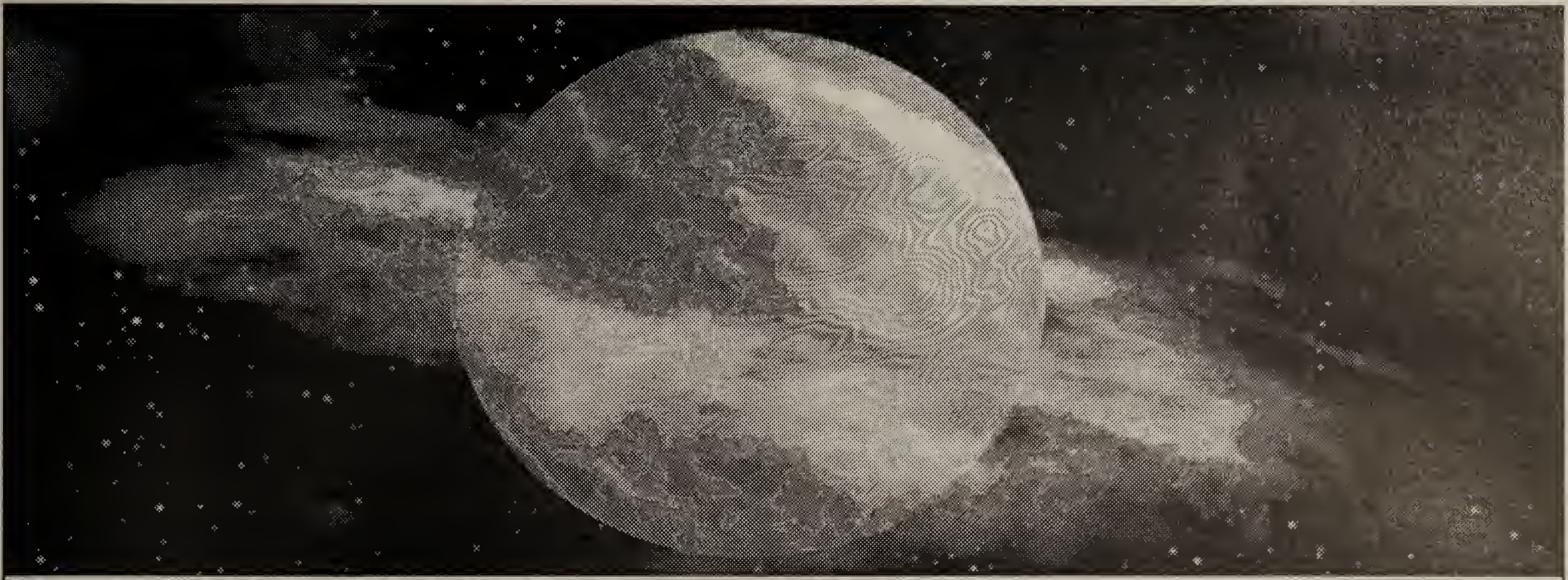

U.S. Robotics intends to make the metaphor of a Global Community a reality. We are a billion-dollar company and the leading provider of end-to-end access solutions, from shirt pockets, laptops and desktops to corporate data centers. Recognized worldwide for our modems, we supply the systems that Internet service providers, online services and corporate data centers use to manage their remote access traffic. These accomplishments are only the beginning of our plan to revolutionize the way people and businesses communicate.

Global Blueprint: Success

The Network Systems Division serves Internet service providers, online services, corporations, institutions and regional Bell operating companies. We provide remote or mobile users with seamless access to information by connecting them to LANs and WANs. We seek world-class professionals who want to explore a new universe of career opportunity with our Chicago-based organization.

Software Test Engineers: Your BSEE or BSCS and 3-6+ years of networking experience are critical in this position where you will be developing and creating test platforms for product regression/stress testing. Knowledge of communication and routing products, UNIX systems and C/C++ experience essential. **(Job Code: DQTE)**

IP Router Development Engineers: Experience with software development and implementation on IP routers required. A MSCS or equivalent and 1-10+ years of industry experience essential. Technical competence with TCP/IP and routing protocols a must. **(Job Code: IP)**

ASIC Hardware Engineers: 10+ years proven track record in development of rack-based embedded systems required. Must have 4+ years of digital logic design for microprocessor-based cards, 2+ years with EPDL, Altera, Xilinx, PAL, memory and peripheral design experience. A background in high performance systems a must. **(Job Code: EHE)**

Senior Embedded Hardware Engineers - Processor Core Design: Consists of: high speed bus design (up to 66 MHz), L2 cache and high speed system memory. Design experience with these processors desirable: Pentium-Pro processor and related chip set, PC peripheral components and PCI local bus design. Experience with Digital Access Interface, PLD and FPGA devices required. Altera and Xilinx devices, VHDL, Synopsis tool set, and Viewlogic a plus. **(Job Code: SEHE)**

Senior Software Engineers - Packet Network Technology: The senior engineer with 7+ years experience developing X.25, Frame Relay or ATM products is right for this position by utilizing network access technologies. Experience with embedded, real-time "C" analysis and implementation a must. A background in a WAN hub environment essential. **(Job Code: SSEP)**

Wireless/Cellular Software Engineers: The software product developer with two or more years experience in tele/data communications is right for this position. Experience with cellular and/or wireless communications essential. C++ and OOD a plus. **(Job Code: WCSE)**

Senior Software Developers: Work with a development group providing UNIX-based systems for testing communication hubs. Solid knowledge of UNIX tools, C programming, interprocess communication and I/O required. LAN/WAN knowledge and project leadership experience necessary. **(Job Code: SSD)**

T1/E1 Software Developers: Your background with 2 or more years experience in embedded system development in a communications environment essential. Experience with VRTX is helpful. **(Job Code: TI/E1)**

DSP Engineers: Your experience writing DSP software for signal applications essential. Modem development, voice compression and video processing experience desired. BSEE required, MSEE preferred. **(Job Code: DSP)**

Multimedia Systems Manager: Manage the development of embedded software for LAN, dial-up voice and video systems. Embedded software development experience and knowledge of "C" programming and real-time operating systems essential. Requires a BSEE/CS or related field and 10+ years industry experience. **(Job Code: MSM)**

Senior Software Engineers - X.75: Develop protocols in X.75 and embedded systems programming. Experience in ISDN or X.25 helpful. BSCS required, MSCS helpful. 5+ years experience and "C" programming skills essential. A background in IP router product development and full product life-cycle a must. **(Job Code: SSE-X75)**

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NETWORK SYSTEMS DIVISION

Locations: A global company, USR is headquartered in Skokie, Illinois, with offices and opportunities in Westborough, Massachusetts; Salt Lake City, Utah; Los Altos, California; Vienna, Virginia; Grass Valley, California; Milan, Italy; Munich, Germany; Dublin, Ireland; and subsidiaries in Lille, France and near London, Paris and other European cities.

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AT&T Wireless Services is number one in wireless communications. And, simply put, we intend to stay that way. That explains the formation of our Strategic Technology Group in Seattle. The mandate is to invent the future and to make that future real in the shortest possible time frame. When you're building a state-of-the-art engineering design team – it's important that you track down the best in the world and give them the tools and resources they need.

The work is important – truly leading edge. The resources are impressive..as are the people on our team. And Seattle is fun, affordable, beautiful, prosperous, scenic, upbeat, cosmopolitan – and, most agree, a really cool place to live.

NETWORK MANAGEMENT SYSTEMS
We are looking for team members with in-depth knowledge of tele/data communications and experience in implementing network management systems in large scale environments, in these areas:

- Telecommunications Management Network (TMN)
- NMF/Omnipoint
- OSI, CMIS/CMIP, and TMN Q3 Interface
- TCP/IP and SNMP

Relevant experience should include a (COTS) network management platform. C/C++; UNIX.

Software Engineer - OO Design
Design/implement object oriented database; experience in ORACLE, SQL, C++, OOD/OOM and object oriented CASE tools is required; knowledge of telecom. NMS is essential. Requires a BSEE/CS with MS preferred; 2-5 years experience in design and development of SW in C/C++; experience of SW development in a UNIX environment; working knowledge of Clearcase, Motif and Sun Solaris.

Software Engineer - Integration/Test
Integration and testing for NMS Systems. Develop agent emulator, agent tester, UNIX test environment lab configuration and help system integration and testing. Requires a BSEE/CS with MS preferred; 2-5 years experience in design and development of SW in C/C++; experience of SW development in a UNIX environment; working knowledge of Clearcase, Motif and Sun Solaris.

Fault Management Software Engineer
Implement Fault Management at all layers of the NMS; design fault management reporting format and presentation; implement fault isolation, fault reporting, alarm summary. Requires a BSEE/CS with MS preferred; 2-5 years experience in design and development of SW in C/C++; experience of SW development in a UNIX environment; working knowledge of Clearcase, Motif and Sun Solaris.

Performance Management Software Engineer
Implement Performance Management for the NMS; duties include performance data gathering, performance monitoring (on demand or periodic) and performance reporting in the service management layer. Requires a BSEE/CS with MS preferred; 2-5 years experience in design and development of SW in C/C++; experience of SW development in a UNIX environment; working knowledge of Clearcase, Motif and Sun Solaris.

Software Engineer, Entry Level
Design and develop SW; rigid testing of work, both self directed and working with third party; participate in and coordinate customer requirements for the NMS. Requires a BSEE/CS with MS preferred; 2-5 years experience in design and development of SW in C/C++; experience of SW development in a UNIX environment; working knowledge of Clearcase, Motif and Sun Solaris.

Network Management Software Engineer
Design and implementation of network management applications over CMIP/CMISE and OSI. Knowledge of C/C++, Sun Solaris 2.x, ToolTalk and UNIX is essential.

Network Management System Administrator
Design and develop UNIX scripts, LAN/WAN configurations, UNIX workstation deployment and configuration, SW loadbuild. Strong UNIX knowledge is essential.

Database Software Engineer
Design and implement Object Oriented database. Experience in ORACLE, SQL, C++, ODD/OOM, OO CASE Tools required. Knowledge of telecom NMS essential.

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NETWORK & TELECOMMUNICATIONS OPPORTUNITIES

DATA

DATA NETWORK PLANNING AND ENGINEERING MANAGER
Manage the development and evolution of data networking technologies to include frame relay, ATM, SONET. Full scope of network responsibilities, LAN and WAN. Southeast, $85-90K.

SENIOR DATA NETWORK ANALYST
Design and implement router technologies for LAN/MAN/LAN applications. Southeast, $50-70K.

SENIOR NETWORK TECHNOLOGIES SPECIALIST
Design, develop, and implement data network solutions for multiple divisions of U.S. based international mfg. organization. Internal consulting position. Midwest, $60-80K.

MANAGER, DATA TRANSPORT ENGINEERING
Manage design and implementation of carrier based data network transport services to include frame relay and ATM. Maintain cost effective network configurations. Support sales and marketing in product/service development. Mid Atlantic, $75-100K.

VOICE

MANAGER, CALL CENTER TECHNOLOGIES
Manages group responsible for optimizing performance of ACD, VRU, and CTI technologies for leading financial services organization. Prior AT&T Definity product experience required. Mid Atlantic, $70-90K.

MANAGER, VOICE SYSTEMS
Support division of nationwide financial services organization in the provision of all voice services, including PBX's, voice networks, messaging, and call center support. Prior AT&T Definity experience required. Texas, $60-80K.

CALL CENTER ANALYSTS (2)
Design and implement call center technologies (ACD, VRU, CTI) using AT&T Definity product line. Texas, Iowa, $50-70K.

VOICE SYSTEM ENGINEER
Design and implement voice hardware and network solutions utilizing NTI Meridian equipment. Projects will include VRU, Wireless PBX, ISDN technologies. Central Florida, $50-70K.

The current, strong, job market provides an excellent opportunity to leverage your technical and managerial skills for career growth. To be considered for these, and other, excellent opportunities, submit your resume to:

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P.O. Box 399
Cedar Mountain, NC 28718
Phone: 704/884-4118 - FAX: 704/884-3512

Senior Consultant: Two full-time openings, 8:00 a.m. to 5:00 p.m., $56,000/year. Designs, develops and manages database applications using state of the art client-server theoretical and technological knowledge of computer systems and databases: Oracle, Reports, Graphics and Forms and Visual Basic; develops GUI-based interfaces to mainframe applications. Qualifications: M.S. in Computer Science or Electrical Engineering. Four years of experience in the job offered or in software development to include: Oracle 7.0 and GUI tools, SQL Plus, PL/SQL, Visual Basic, C, UNIX, COBOL, relational, network, hierarchical databases and database administration. Submit resume to: Terri Trester, 8335 Allison Pointe Trail, Suite 205, Indianapolis, IN 46250.

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Drop by the Career Fair directly off the exhibit floor. Fair opens at 10:00am Wednesday.
Participants include the Boeing Company, Cabletron, Cisco, Compuserve and GTE...

NETWORKS HAVE ALWAYS BEEN ABOUT SUPPORTING GROWTH.

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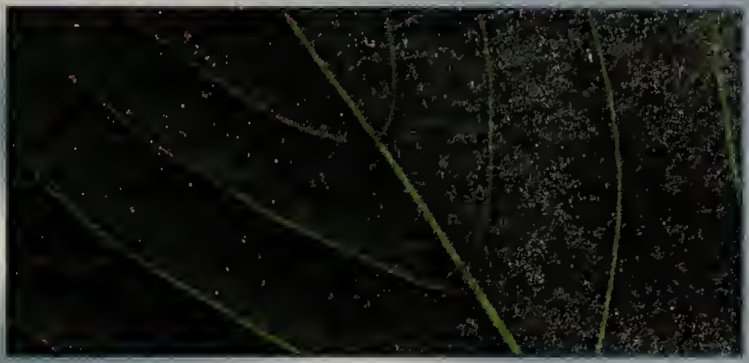

The concept of networking has some very natural roots. But in today's business world, no company is delivering healthier results than Bay Networks. Whether it's seamless communications, global connectivity or real-time data sharing, our switched internetworking products are enabling businesses and individuals not just to share ideas — but to grow in new ways.

How do we do it? By creating solutions in fields that range from local and wide area communications to remote and Internet access. By inspiring our people to express themselves on both an individual and universal level. By planting the technological seeds for a more vital global community. All of which means that, at Bay Networks, your talent could spark a world of change. And what could be more enticing that that?

Systems Engineer

Orlando, FL; Boca Raton, FL; various cities

Work with Territory or Enterprise Sales Representatives to facilitate sales in a given territory or account. Provide pre/post-sales technical support including product presentations and demonstrations, network designs, writing proposals and customer support. Requires solid data communications experience with thorough networking standards and protocols such as Ethernet, Token Ring, FDDI, ATM, switching, Fast Ethernet (100BASE-T), routing, UNIX, SNMP and RMON network management. An extensive background in the design, installation, operation, maintenance and management of medium-to-large scale data networks at the physical data link and network layers of the OSI model is also required. Knowledge of OSPF and RIP is highly desirable.

PROFESSIONAL SERVICES

Area Managers

NYC; Dallas, TX; Denver, CO; Chicago, IL; Santa Clara, CA

Manage a group providing network consultation to customers. Strategically direct a project team to increase revenue through the delivery of value-added services. Assist in the design and implementation of large, complex, multi-protocol, multi-vendor network environments to resolve business changes. BSEE/CS with 10+ years' experience in data communications and a minimum of 3-5 years in the networking industry is essential. Requires an understanding of consulting processes, products and markets. Must also possess in-depth knowledge of two or more of the following: TCP/IP, XNS, SNA, IBM Source Routing, AppleTalk, IPX and ISO. Extensive travel and the ability to manage remotely are musts.

Senior Network Engineer

Los Angeles, CA; Westboro, MA; Hartford, CT; Columbus, OH; Raleigh, NC; Charlotte, NC; Richmond, VA; Washington, DC.

Implement network designs by installing all network and related hardware. Configure network and system software to bring network to full operation. Provide staging and integration services at customer locations. Configure, set-up and test new products. Load IP addresses, optimize software configuration, develop router tables and verify equipment meets installation specifications. BSEE/CS, 5+ years' industry experience and knowledge of network diagnostic tools are required. Strong communication/customer interaction skills are also essential. Must have a baseline understanding of TCP/IP, RIP, OSPF, ATM, routing, Fast Ethernet, subnet masking, IP numbering schemes and network segmenting. Requires ability to travel locally and overnight.

Territory Sales Representative

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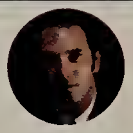
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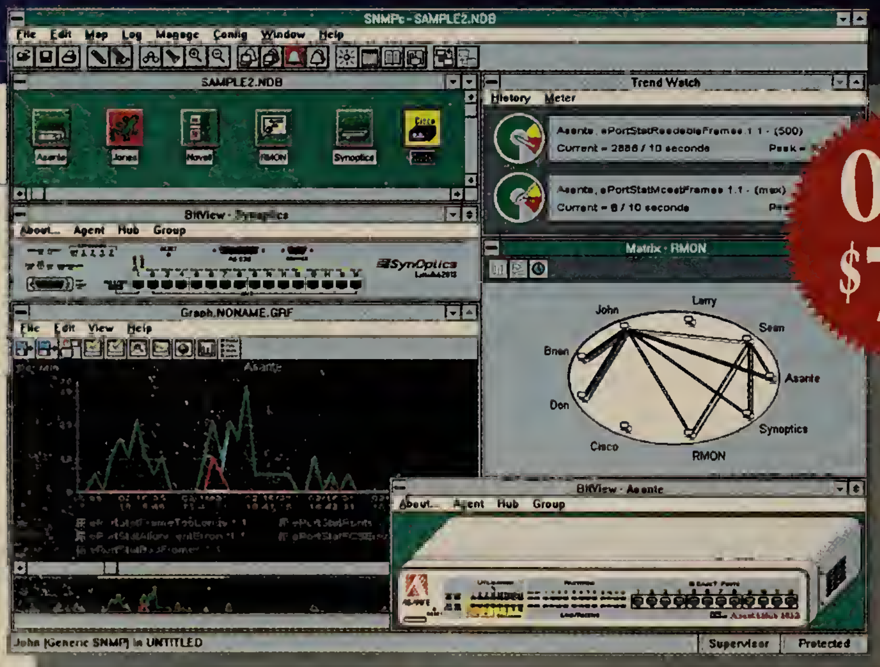

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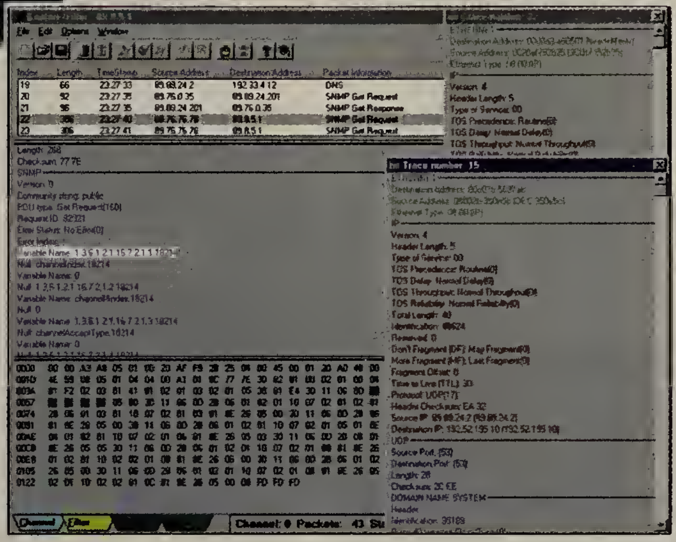

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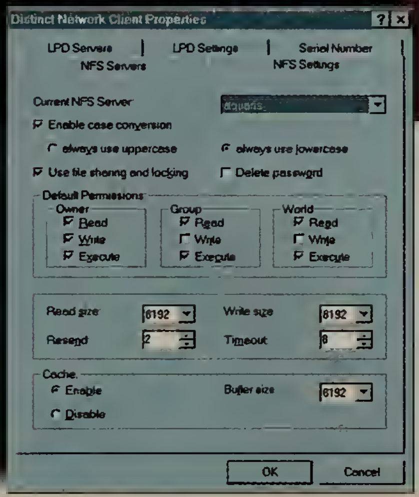

Distinct Network Client Properties

LPD Servers | LPD Settings | Serial Number

NFS Servers | NFS Settings

Current NFS Server: dolphis

☑ Enable case conversion

○ always use uppercase ● always use lowercase

☑ Use file sharing and locking ☐ Delete password

Default Permissions

Owner: ☑ Read ☑ Write ☑ Execute

Group: ☑ Read ☐ Write ☑ Execute

World: ☑ Read ☐ Write ☑ Execute

Read size: 8192 Write size: 8192

Resend: 2 Timeout: 8

Cache: ● Enable ○ Disable Buffer size: 8192

OK Cancel

Highlights:

- Integrates seamlessly into Windows 95
- Mounts NFS drives from Explorer or Network Neighbrhood
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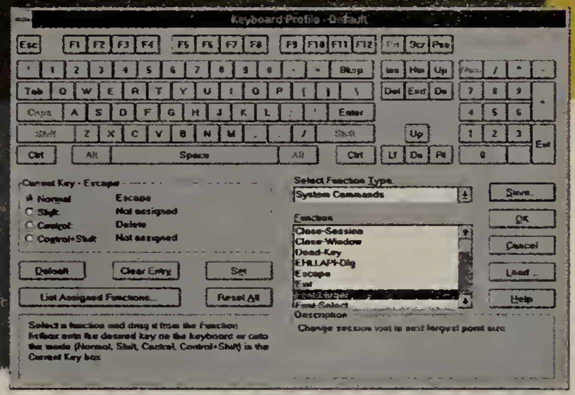

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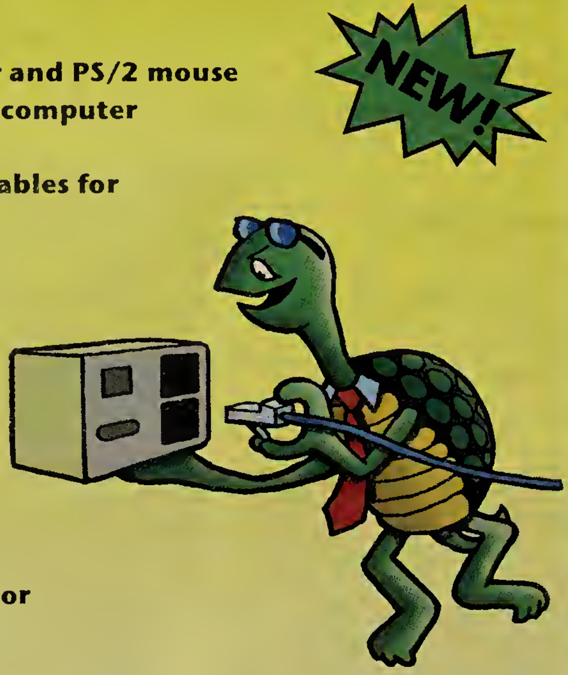

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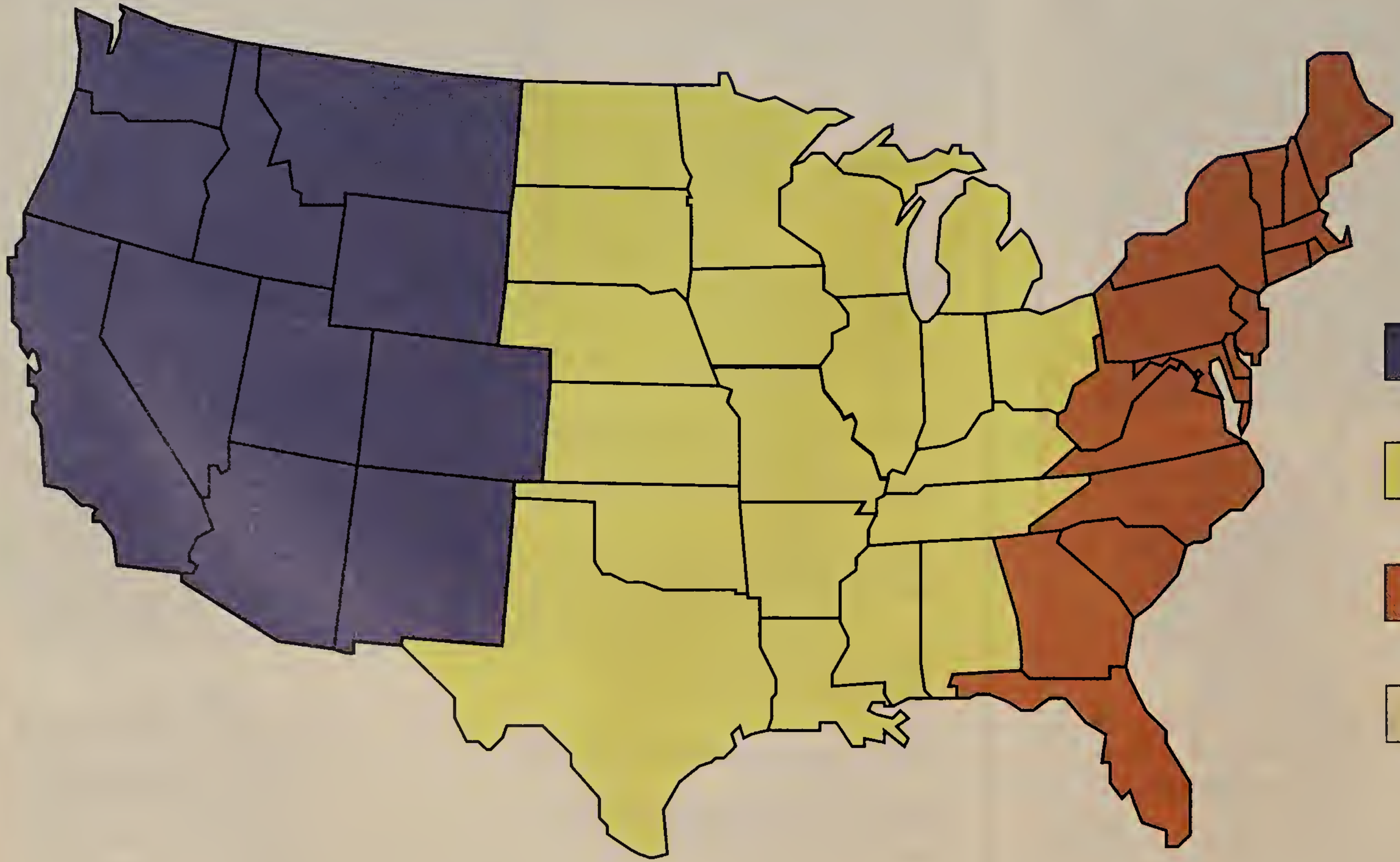

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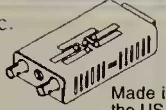

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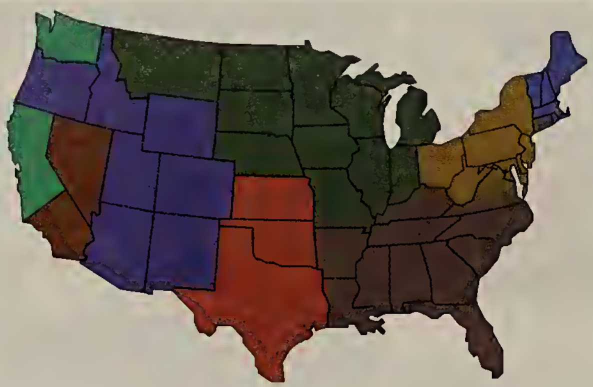

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WorldCom

Continued from page 1

bundled in a single contract with other services.

"WorldCom is virtually nobody's primary carrier except for large resellers, and until now almost no one was willing to change that," said Hank Levine, a Washington, D.C. lawyer who negotiates large user contracts.

But many big users already give a percentage of their traffic to WorldCom to keep their main carrier on its toes, he added. If WorldCom can just shift the percentages around to grab the bulk of the customer's business, WorldCom President Bernard Ebbers could come off looking mighty good.

"If Bernie gets even a quarter of the uncommitted traffic of the Fortune 250, he can retire with a few billion dollars," Levine said.

Watch the track record

The success of the merger depends on the increasingly uncertain pace of telecom reform. Two days after the merger announcement, two large local exchange carriers sued to block the Federal Communications Commission's August order on local-loop interconnection (see story, page 1).

The FCC had granted a key break to MFS and other carriers that install their own switches over new local carriers such as AT&T who plan to resell regional Bell operating company services (*NW,* Aug. 12, page 21). If the FCC is forced to rewrite its order, the AT&T brand name may overwhelm MFS WorldCom in the competitive local marketplace.

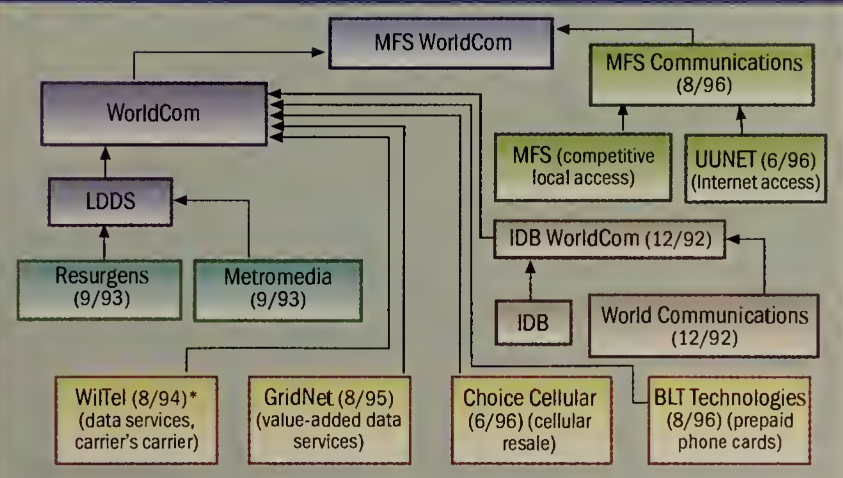
The potential delay in telecommunications reform is just one of the many challenges facing MFS WorldCom. The company is the offspring of an extraordinary series of pairings, with its very name a carryover from a company once known as World Communications, which has now been bought three times (see graphic). And WorldCom does not have a strong track record of integrating the networks of acquired companies, said Eric Paulak, a research analyst at Gartner Group, Inc. in Stamford, Conn.

Because of that, Paulak advised users negotiating with WorldCom to pin the carrier down to service level agreements (SLA) with penalties for outages. He said they should also try to negotiate language into their contracts saying that the carrier will pass local-access fee savings along to customers.

Some service markets may be difficult for MFS WorldCom to crack. Private-line and frame relay users could clean up with MFS' dedicated access services.

But AT&T, MCI Communications Corp. and Sprint Corp. will likely continue to control users' virtual private networks, which depend on a mix of dedicated and switched access, Levine said.

In addition, many WorldCom customers who began working with the carrier prior to its 1994 acquisition of data specialist WilTel Network Services reside in smaller cities. In many of those spots, MFS only has reseller status and must pay access fees to the local RBOC, just like AT&T and others operating as resellers in those areas.



MFS WorldCom is a pyramid of acquisition

MFS WorldCom
WorldCom
MFS Communications (8/96)
MFS (competitive local access)
UUNET (6/96) (Internet access)
LDDS
IDB WorldCom (12/92)
Resurgens (9/93)
Metromedia (9/93)
IDB
World Communications (12/92)
WilTel (8/94)* (data services, carrier's carrier)
GridNet (8/95) (value-added data services)
Choice Cellular (6/96) (cellular resale)
BLT Technologies (8/96) (prepaid phone cards)

Dates indicate when entity was purchased or formed by next higher level. Entities not otherwise described were formerly domestic voice-grade telecommunications carriers. The name WilTel now belongs to an equipment supplier that is independent of MFS WorldCom. Chart does not include numerous additional minor acquisitions.

*Deal actually closed Jan. 1995, by which time LDDS (which acquired WilTel) became WorldCom, Inc., doing business as LDDS WorldCom.

Keeping the focus

Paradoxically, the merger could even be a blow to UUNET's grand vision of leveraging MFS' worldwide fiber and financing to build out its Internet backbone internationally. Analysts said WorldCom historically has done little to expand the companies it has acquired.

"This leaves a doubt as to whether [UUNET] will get the funds and expansion promised by MFS now," Paulak said. However, UUNET officials discounted any problems resulting from corporate upheaval.

But Alan Taffel, vice president of sales and marketing at UUNET, said the decision has been made for UUNET to maintain its autonomy and brand name.

UUNET sales representatives will remain focused on selling Internet services, he said, and will benefit from having WorldCom's 2,900 salespeople currently pushing UUNET-labeled offerings.

And the merger makes the company an end-to-end facilities-based 'Net provider, which confers a cost advantage. Controlling the network from doorstep to doorstep will also enable the company to offer intranet SLAs to customers with sites in places where MFS has either facilities or resale status.

Senior Writer Tim Greene contributed to this story.

NetworkWorld
161 Worcester Road
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Periodicals postage paid at Framingham, Mass., and additional mailing offices. Posted under Canadian International Publication agreement #0385662. *Network World* (ISSN 0887-7661) is published weekly, except for a single combined issue for the last week in December and the first week in January by *Network World*, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

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FCC

Continued from page 1

an August FCC ruling spelling out how much local exchange carriers (LEC) can charge competitors for hooking into their networks.

Southern New England Telephone Co. (SNET) and GTE Corp. — two of the largest independent LECs — asked the FCC to put the regulations on hold until the carriers can prepare similar lawsuits. The regulations would take effect in October.

BellSouth Corp. said it, too, plans to sue, claiming the FCC did not have the authority to determine what the LECs can charge for giving competitors access to their local networks. The FCC's plan was seen as beneficial to the LECs' potential rivals because, in many cases, it gave them better interconnection terms than they had been able to negotiate on their own.

A 60-day protest period on the ruling opened last week, meaning the court has to wait that long before it can pull all the lawsuits together into a single proceeding. Hearing the case could take months more, according to one attorney.

SNET and GTE claim the FCC overstepped its bounds because the Telecommunications Act of 1996 gave individual states the power to set interconnection rules. The National Association of Regulatory Utility Commissioners (NARUC) used the same argument in the suit it filed in a U.S. appeals court.

Even if the FCC was acting within its power, the ruling sets unfair methods for states to use in determining what LECs can charge for interconnection, SNET said. The FCC also set the actual discounts LECs must offer in cases where states do not establish interconnection discounts of their own, and SNET said the FCC's default discounts are too deep.

For example, SNET said 8% to 10% is a fair discount, but the FCC set a range of 17% to 25%.

Adhering to the FCC rules would force SNET to lose money, and that would be an unconstitutional taking of SNETs property, according to SNET attorneys.

Beyond the pricing issues, SNET said the FCC ruling specifies seven network elements, such as local loops, interoffice trunking and signaling, that LECs must sell separately. That is such a broad selection that it will take enormous amounts of time and money to offer that access and to figure out how much to charge for it.

Senior Editor David Rohde contributed to this story.

UUNET to launch NT option

By Joanie Wexler
Fairfax, Va.

UUNET Technologies, Inc. tomorrow plans to launch a second Web hosting option: Services based on Microsoft Corp.'s NT Server 4.0 will join the company's 2-year-old Unix-based offerings.

In addition, the Internet service provider will issue the first of its long-awaited quality of service guarantees for its 'Net connectivity services. All customers will receive prorated compensation for 'Net access downtime beginning this week, the firm said.

For example, if Internet access is down for an hour, the customer will receive a day's free access as compensation, said Alan Taffel, the company's vice president of sales and marketing.

Come tomorrow, companies will be able to go to UUNET for NT Server 4.0 hosting services. NT Server 4.0 has built-in Web services, such as the Microsoft Internet Information Server Version 2.0, the Microsoft FrontPage 1.1 Web authoring and management tool, and Microsoft Index Server, a content indexing and querying search engine.

Today, UUNET supports 800 customers using Berkeley-Unix based services, according to Paul Hoffman, UUNET manager of business development.

Analysts are not sure how popular NT-based hosting services will be because most companies have already developed home pages based on Unix.

"If you migrate your Web site from Unix to NT or vice versa as you shift where you do your hosting [on premises or in a service providers' network], you're likely to lose your programming investment," said Greg Wester, research director at The Yankee Group, a Boston network consulting firm.

That would likely happen to most users, as "there aren't too many high-end sites being hosted on NT these days," he said.

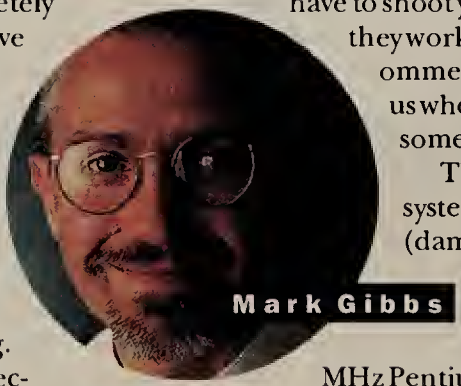
The NT hosting start-up fee is $5,000 plus a monthly fee of $3,000, including 5G bytes of data transfer per month. Dedicated server NT hosting is available now; shared server versions will appear in October. ■

The Gibbs Institute announces the new wave: Take Tea(tm), not Java(tm)

Here at the Gibbs Institute of Computer Science and Virtual Prestidigitation, we have been working overtime. With the emergence of Java(tm), JavaScript (tm), VBScript and the rest of the godlike languages, we reckon that when it comes to keeping up with application development, information technologies groups worldwide are busier than Jack Kevorkian in an old folks home.

Therefore, being the ruthless bast... er, shrewd marketeers we are, we see a ripe marketing opportunity: The Gibbs Institute is pleased to announce a new programming language — Tea(tm).

Tea(tm) is designed to compete directly with Java(tm). Unlike Java(tm), Tea is extraordinarily simple. Tea(tm) was designed to be completely accessible to users who have trouble balancing their checkbooks.


Mark Gibbs

The basis of this simplicity is that Tea(tm) implements state-of-the-art programming features. In particular, Tea(tm) relies heavily on GOTOs for ease of coding. And to improve error detection, Tea(tm) requires matching COMEFROMs(tm).

In addition, we have gone way beyond object-oriented programming. With Tea(tm), we introduce the latest advance: Paradigm-Oriented Programming(tm) or POP(tm).

Instead of specifying objects and their relationships and behavior and all that junk, you just provide vague descriptions of what you kind of want your program to do (for example, "calculate some stuff, I don't quite know what yet"), and the compiler takes a wild guess.

If the Tea(tm) compiler (you won't be surprised to hear that it's called Tea-Strainer(tm)) gets it wrong, it randomizes its guesses and tries again. You are guaranteed to get what you want ... it just might take awhile. The upside is that, as you can see, programming and design are minimal, which is something that Java(tm) can't boast. Nyah, nyah, nyah.

Unlike Java(tm) programs, which can be distributed in either byte-code form (applets) or compiled into binary form, Tea(tm) applications, called Tea-Bags(tm) (catchy, eh?), are distributed in source code form translated into Ancient Sumerian for security purposes.

With Tea(tm), you just provide vague descriptions of what you want your program to do.

In the future, we expect to supply alternative security options, including encoding in several of the African "click" languages.

Unlike Java(tm), which is reputed to have bugs in its security architecture, Tea(tm) has truly robust system security and access controls that are so powerful and so highly classified that we would have to shoot you if we told you how they work. Therefore, we recommend that you just trust us when we say it's awesomely good.

The Tea(tm) runtime system, called TeaPot(tm) (damn, we're good), has a small resource demand, provided you're using a 200-MHz PentiumPro with 128M bytes of RAM and a 4G-byte hard disk.

Technical support will be supplied solely through those dweebs — er, visionary individuals — who glom onto the Tea(tm) marketplace and have lots of time on their hands, which is why they conduct endless smug conversations in the programming newsgroups to show off their arcane knowledge in lieu of getting a date and a life. But we digress.

Tea(tm) will be available as a free beta release and will continue to be free when it achieves full-release status. We intend to make our pile of cash selling Tea(tm)-branded clothing (including, of course, Tea-shirts), pocket protectors and Tea(tm) cups.

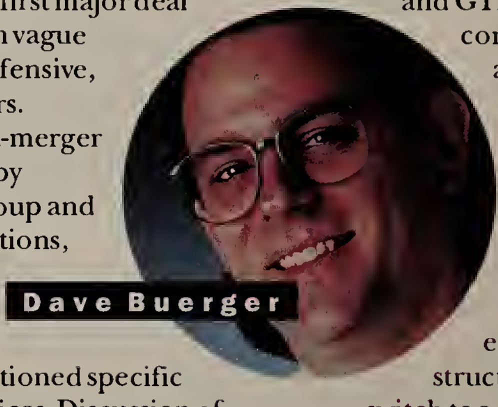
So, if you'd like the Tea(tm) Software Developers Kit, just connect to http://www.gibbs.com/TeaTable, download the 200M-byte file and get coding. Come and get it. . .it's TeaTime(tm) (pat.pending) (sm)!

Will you take Tea(tm), or do you prefer another beverage? Send deep thoughts to mgibbs@gibbs.com, or call him at (800) 622-1108, Ext. 504.

Local phone monopolies throw wet blanket on regulation

Just when it looked like telecommunications reform was finally on its way, the local phone monopolies last week showed their true colors by announcing they will try to block new FCC regulations in court.

The week started with great news for business users. The $12 billion merger announcement between WorldCom, Inc. and MFS Communications Company, Inc. was the first major deal to offer more than vague promises from defensive, established players.


Dave Buerger

Previous mega-merger announcements by Pacific Telesis Group and SBC Communications, Inc., and Bell Atlantic Corp. and NYNEX Corp. barely mentioned specific new business services. Discussion of cost efficiencies and the opportunity to purloin long-distance business received more play. Bully for investors, but what about the users?

The MFS-WorldCom deal is different. The new company will meld Internet access, local and long-distance networks into a one-stop shop for business communications. This will be the first and only integrated alternative to Baby Bells and major long-distance companies.

The loss of revenue and profit from large business customers is threatening local service providers.

The scope of MFS-WorldCom's initial service integration will include 500,000 business customers in major metropolitan areas and more than 200 countries.

This deal was too much for the local phone monopolies. GTE Corp. (whose chairman had urged passage of the Telecommunications Act of 1996 in the name of competition) and Southern New England Telephone Co. said they will ask an appeals court to block FCC regulations enforcing the new law. Baby Bells are expected to file their own appeals.

Their paranoia stems from the threatened loss of money. Large business customers deliver a big portion of local service providers' revenue and profit.

Baby Bells have the most to lose. Competitors will be chasing the Bells' prime business customers for local and Internet service. So instead of competing in the market as they promised, local providers are falling back on their primary skills — lawsuits and more lobbying.

The Bells are stalling to open access to their switching facilities because that's the key way most competitors can reach local customers. Long-distance companies are in arbitration with all seven Bells and GTE to crack that nut. The telecom reform law requires all access negotiations to be completed by year-end. Appeals to that law will now drag the process out, possibly for years.

None of the Bells have plants in other Bell regions (hence their mergers) or a long-distance infrastructure. Their inability to switch to a competitive business model is why they are resorting to old tricks.

As for the Big Three long-distance carriers, MFS-WorldCom's merger prompted a reaction from MCI Communications Corp. Having built its own switching facilities to offer limited local service to businesses in 12 U.S. cities, MCI said last week it will expand to 25 cities by the beginning of 1997.

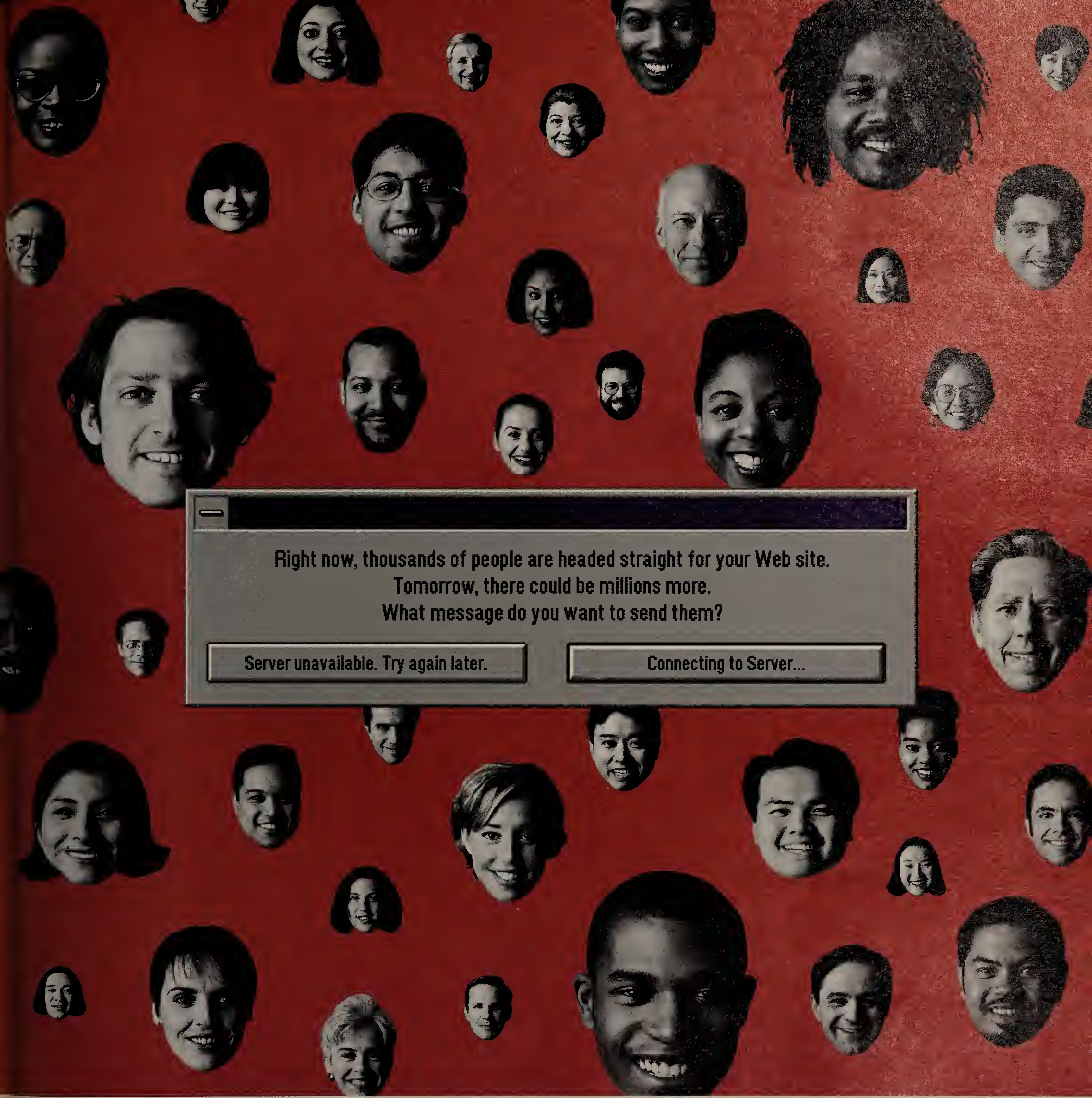
AT&T has filed to provide local service in all 50 states, primarily through access agreements with the Bells and competitive access providers. AT&T says it will build facilities where appropriate.

Sprint Corp. is the quietest about its local service plans — perhaps because it's already the second-largest independent local provider. Sprint claims nearly seven million residential and business customers in 19 states. It has not announced a national strategy for integrating local, long-distance or Internet services.

GTE's and the Bells' pending legal appeals mean the quickest chance for local competition will come from vendors who do not rely on the local providers' equipment, like MFS-WorldCom. Other new local competition will be from forthcoming wireless and cable services.

The Bells and GTE have proven their main concern is to preserve monopoly empires, not foster competition. Let's hope the FCC gives these actions careful consideration before granting the Bells permission to sell long-distance services.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.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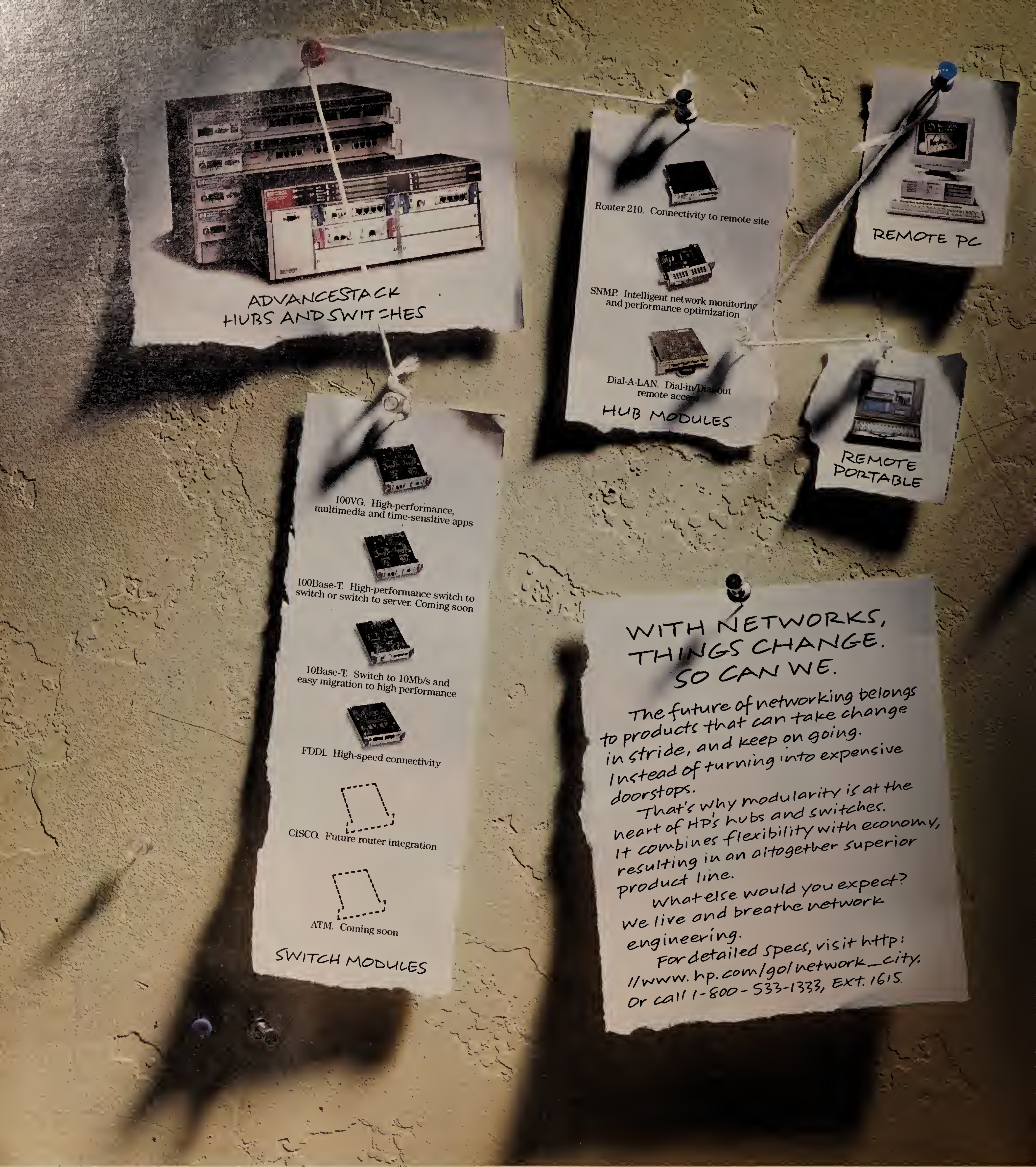

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